March 29, 1948

STEEL

The Magazine of Metalworking and Metalproducing

IN TWO SECTIONS, SECTION ONE ESTABLISHED 1882 EDITORIAL INDEX, PAGE 35

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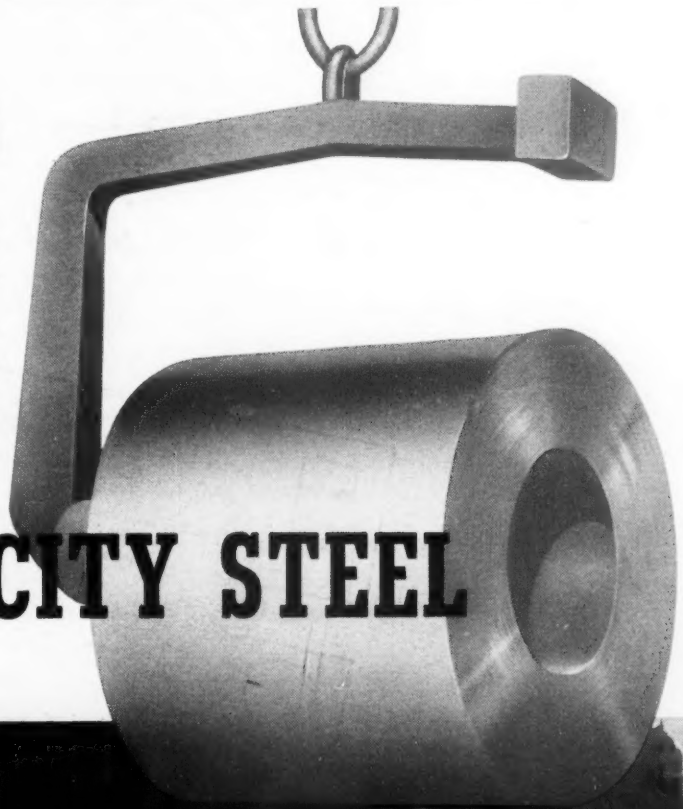

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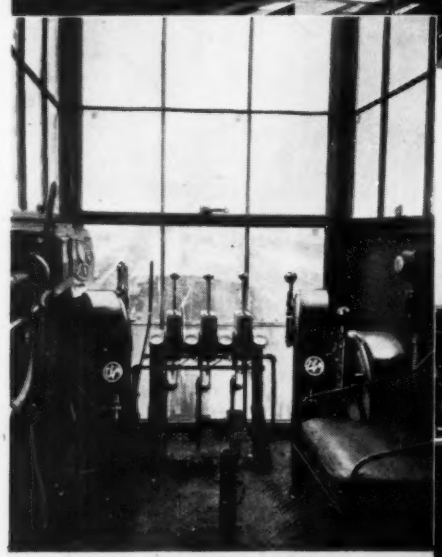

Operator's Cab (Seat Removed) shows efficient arrangement of Master Switches and Clutch Pilot-levers.

Hoist unit—Magnetic Control Panels and Type H Alloy Grid Resistors (overhead).

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How Shot Peening of Meehanite Increases Fatigue Life

Descaling Stainless Sheets

STEEL

The Magazine of Metalworking and Metalproducing

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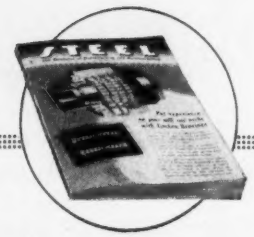

March 29, 1948

Words and Deeds

It is too bad that aggressors of the world cannot learn to understand the United States or that we cannot learn to speak a language they will understand.

Kaiser Wilhelm, thinking we were too proud to fight, unwittingly provoked us into war. Hitler and Hirohito, both discounting us because of our repeated acts of appeasement, belatedly discovered we had the punch to win World War II. Now there is danger that Stalin, mistaking our confusing foreign policies for national apathy or weakness, will unconsciously force us to extreme measures.

Thus today for the third time in a third of a century we find ourselves in the unhappy position of trying to prove to a doubting world that we mean business. Apparently if we are to be taken seriously we must match words with deeds. We must display the physical as well as the moral capacity to act decisively.

This means a return to a degree of preparedness that will alter our domestic economy drastically. Whatever portion of the appropriation submitted by the military authorities last Thursday that is approved by Congress will heap new demands upon industry, which already was wondering how it could satisfy ERP requirements on top of its unfilled domestic orders. If any sizable mobilization program is adopted, it will necessitate painful rationing of materials and facilities that already are in short supply.

In view of this unpleasant prospect, would it not be wise to press for immediate action on some of the "musts" on which we have been stalling for months? For instance, why not quit talking about the millions of tons of scrap in Germany and actually ship some of it to our mills? Why not begin to do some effective stockpiling in practice instead of on paper or in debate in Congress? Why not have a definite showdown on the shipment of equipment to Russia? Either we do or we do not and why? The correct decision is long overdue.

Also, if President Truman's latest cry of "wolf, wolf" is the crisis it appears to be, to what extent does our preparedness take precedence over ERP, our Grecian and Turkish commitments and Far East relief?

We can't do everything all at once.

* * *

DISTRUST ALLOCATION: Requirements for farm machinery under ERP are estimated at $136.3 million during the first 15 months of the project in 1948 and 1949, $161.5 million for 1949-50, $131.8 million for 1950-51 and $115.5 million for 1951-52.

The Secretary of Commerce says this schedule has been set up despite the fact that last year farm equipment manufacturers were unable to meet domestic and foreign demands and that output currently allocated for export is only one-half of export demand. Hopes that the schedule can be met, he says, are based upon indications that the industry can increase production and that more steel can be made available.

This goal for 1948-49 seems formidable, yet the farm equipment manufacturers two weeks ago decided they would prefer to take their chances of obtaining sufficient steel from their regular suppliers rather than to participate in the government sponsored voluntary allocation plan. It is clear that they thought they could do better on their own than if they were depend-

(OVER)

ent upon government directives. Some railroads, car builders and foundries also were opposed to allocation on the car building program.

This distrust of government supervision is understandable. Directives from Washington can make industrial activity conform to an agreed upon national pattern but they achieve this at a terrific waste of time, money and individual effort. —pp. 46, 52

* * *

WAGES, TAXES, PROFITS: A fascinating feature of the annual financial report of United States Steel Corp. in recent years has been the table showing the disposition of sales revenue from 1902 to date. In the report for 1947, just released, the figures cover an unbroken span of 46 years.

Most noticeable shifts in the distribution of the sales dollar during this period are in connection with wages, taxes and net income. Ever since the corporation was formed there has been a trend, only rarely interrupted, toward paying out more and more of the sales dollar in wages and in taxes and retaining less and less in net profit available for dividends to stockholders and for surplus for future needs of the business.

These long-term shifts are reflected in the percentage of net profit to sales. For instance, during the first six years of the corporation's existence, its annual net profit averaged 17.0 per cent of sales. During the six full years since Pearl Harbor, its annual net profit averaged only 4.2 per cent of sales. In 1947 sales were $2.1 billion, an all-time high, yet net profit of $127.1 million was only 6 per cent of sales. This percentage has been exceeded in 30 of the 46 annual reports.

The corporation record affords a long-range perspective that is generally typical of many companies in the metalworking industries. It should be studied carefully by short-term minded critics who say that present profits are excessive. —p. 54

* * *

STOCKPILING LAGS: In spite of all that has been said since V-J Day about stockpiling strategic materials, the plain truth is that little progress has been made. The nation's stockpile of manganese ore, for instance, is insufficient to meet requirements for more than six months at the present rate of consumption. Notwithstanding this unsatisfactory situation, the Subcommittee on Mines & Mining of the House Public Lands Committee does not expect to begin work on writing an omnibus bill on minerals until late in April.

Experts on manganese ore, testifying before the subcommittee, agree on three things: First, a national stockpile of suitable manganese ore is highly desirable. Secondly, the outlook for importing foreign ore is not improving. Third, stockpiling in the short term must rely heavily on new and expanded production of domestic ores.

The handwriting on the wall is clear. We should get busy pronto. —p. 48

* * *

DIESEL R. R. SHOPS: After visiting the transformed locomotive shops of the American Locomotive Co. in Schenectady, Machine Tool Editor Guy Hubbard expressed amazement at the extent to which they differ from the conventional locomotive shop of the past. "Instead of seeing the old familiar boiler work and big wheel work and all the other locomotive crafts being practiced, I saw what in effect is a beautifully equipped plant for the interchangeable manufacture of huge motor vehicles designed to run on rails instead of roads."

This change has been occasioned by the rapid shift in preference by American railroads for diesel locomotives over the old steam units. The shift gradually will be reflected in marked changes in the round house and back shop equipment of railroads. Eventually it will present a radically different market to machine tool builders and equipment manufacturers. —p. 76

* * *

ORE, COAL STOCKS LOW: Raw material supplies are dangerously inadequate. Stocks of iron ore on hand at furnaces and Lake Erie docks are at the lowest level for any comparable period in history, totaling only slightly over 15 million tons. Any delay in the opening of lake navigation due to ice would result in an acute shortage within a few weeks.

Even before the miners stopped work, soft coal production in the early weeks of 1948 had been lagging 6.5 per cent behind output in comparable weeks in 1947. Under the most favorable conditions that can be imagined, it will take a long time to restore coal stocks to normal. —pp. 44, 62

E. L. Shaner

EDITOR-IN-CHIEF

Production Line Methods Build Better Boilers

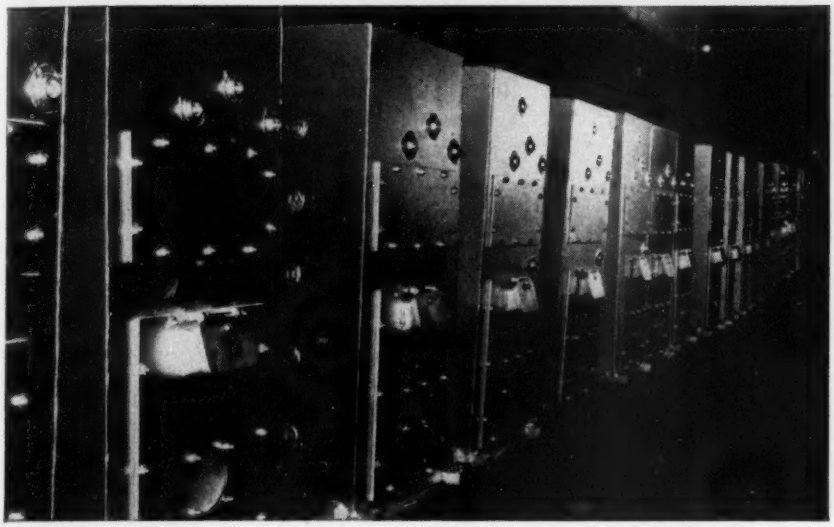

Fig. 1. A conveyor line of finished "Transotherm" all-welded boilers.

By CARL BLIM, President
The Utica Structural Steel, Inc., Utica, N. Y.

THROUGH the use of arc welding we have been able to adapt conveyor line production methods to the manufacture of our "Transotherm" Boilers. These boilers are sold to industrial users and must be capable of withstanding higher operating pressures.

All parts for our boilers are prefabricated from 3/16" steel plate, blanked and pressed to form. Quick acting jigs are provided for all subassemblies to clamp the component parts securely to resist warpage and allow downhand welding wherever possible.

The firebox unit assembly is hand welded using a 300-ampere "Shield-Arc" welder and "Fleetweld 5" electrode. (See Fig. 2.) The outside steel jacket is welded with the "Lincolnweld" Automatic Welder (Fig. 3), producing both a fast weld (rate 80" per minute) and a smooth bead for a clean appearance.

The formed flue plates are held in pairs in a rotary jig and the end seams welded (Fig. 4). The flue plate sub-assembly is then fitted to the manifold plate, allowing a 3/32" opening in the joint to insure proper penetration of weld (Fig. 5).

After production welding the flue plate assembly, the unit is tested under water with 60 lb. air pressure to detect leaks.

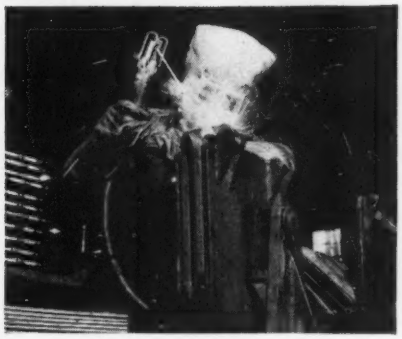

Fig. 4. Quick clamp jig for flue plate assembly.

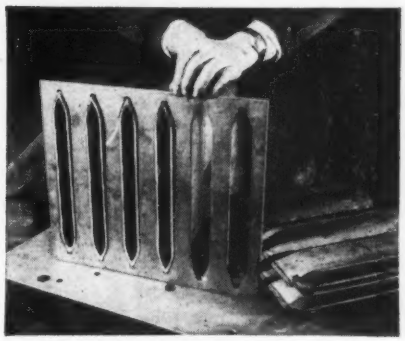

Fig. 5. Fitting flue plate to manifold.

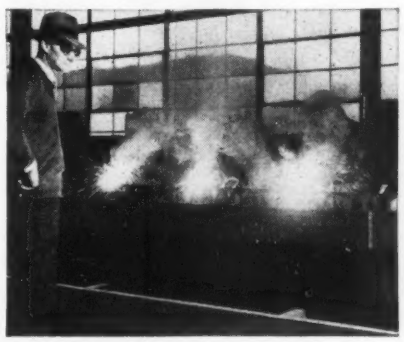

Fig. 6. Production welding flue plates to manifolds.

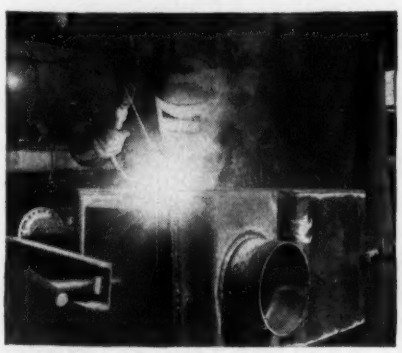

Fig. 2. Hand-welding the fireboxes.

Fig. 3. Automatic welding the outer steel jacket at a rate of 80" per minute.

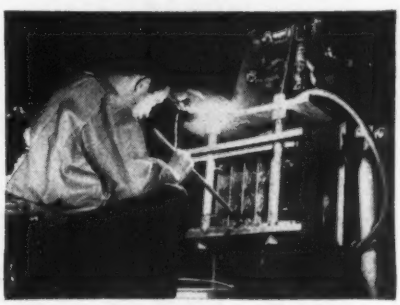

Fig. 7. Complete check made for pressure tight bead.

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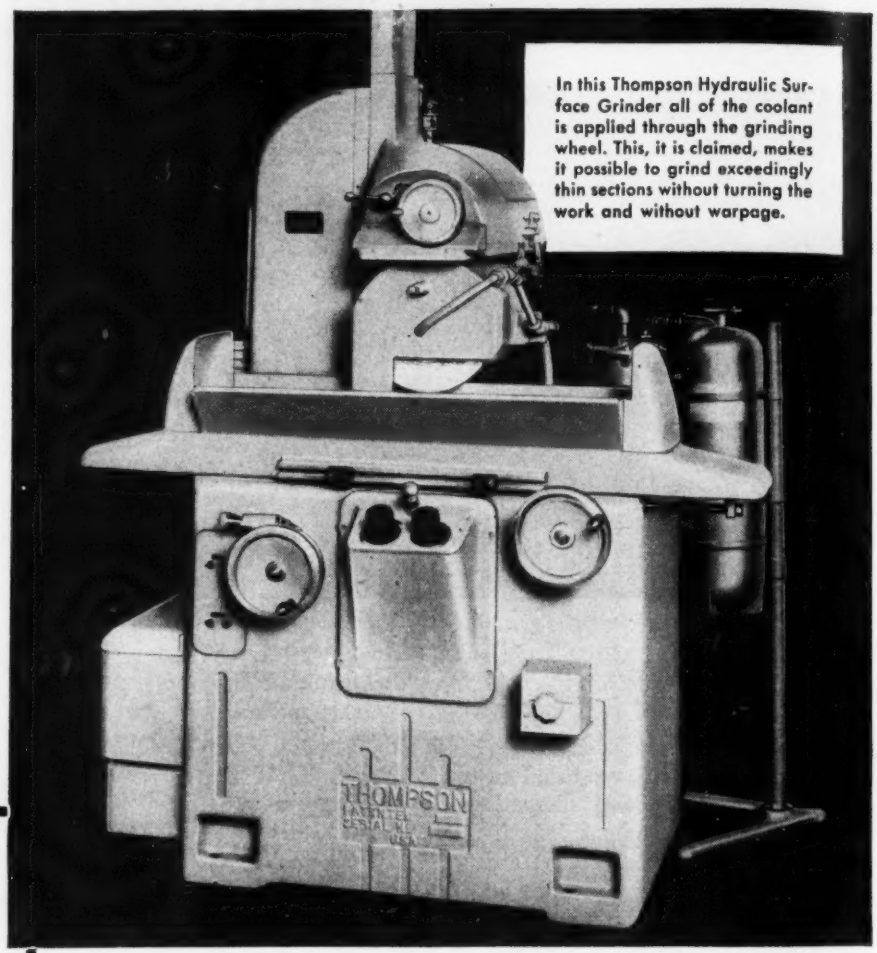

In this Thompson Hydraulic Surface Grinder all of the coolant is applied through the grinding wheel. This, it is claimed, makes it possible to grind exceedingly thin sections without turning the work and without warpage.

Photo courtesy The Thompson Grinder Company

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News Summary

HOW LONG?—First major cutbacks in iron, steel and foundry operations as result of the coal miners' walkout appeared last week, with the promise of further and sharper reductions to come (p. 43). Effect on the steel consuming industries will be delayed, but no less keenly felt. Conservation measures are being placed in effect, with restrictions on use by railroads and with exports embargoed. Meanwhile the industry is wondering why 13 days are necessary for the administration's fact-finding board to make its study of the dispute, presumably prolonging the mine idleness until after Apr. 5.

MILITARY PREPARATIONS—This country's expanding program of military preparation increases the chances for adoption of mandatory economic controls (p. 46) to supplant the voluntary system which has been in the formative stages since late last year. Washington observers now estimate the chances that "must" controls will be approved at 50-50. Military expenditures for the fiscal year starting July 1 probably will be stepped up substantially, with $14 billion for the year now being mentioned. Between 25 and 35 per cent of steel output may soon be going into materiel, foreign aid and critical domestic programs. Alloy steel, which has been lagging in an otherwise tight market, is in high demand again and electric furnaces which have been producing carbon steel (p. 47) are reverting to alloy production.

STRATEGIC MATERIALS—The stepped-up military program is focussing new attention on this country's supplies of and sources for the strategic and critical minerals. High on the list in point of concern is manganese, for which the United States depends largely on imports. An omnibus minerals bill, to cover imports, stockpiling and development of domestic sources, is under study by a congressional committee (p. 48).

ECONOMY IN GOVERNMENT—Congressional enthusiasm for economy too often fades before the demands of pressure groups for appropriations of public funds. This was pointed out to Senate Appropriations subcommittee (p. 50) by a representative of small business who complained that the Army Civil Functions bill is loaded with public works improvements which are unnecessary at this time.

RISING COSTS—A substantial portion of the United States Steel Corp.'s pamphlet report (p. 54) is devoted to detailing increases in costs of the goods and services it purchases. While base steel prices increased only about 40 per cent from 1940 to the present, the corporation cites these cost increases: Wages, 80 per cent; brick construction, 250 per cent; fuel oil, 130 per cent; scrap, 93 per cent; coke ovens, 150 per cent.

PRODUCTION LOSS AVERTED—Ford Motor Co. reduced an anticipated loss of 30,000 tons of cold-rolled steel to only 7000 tons by cutting the time necessary for installation of a new strip welder from 45 days to 12 (p. 57).

SURPLUS TOOLS—War Assets Administration is moving to place all new offerings of machine tools and industrial equipment on a competitive bid basis (p. 45), to assure complete offerings of residual equipment by June 30. Sales at fixed prices will end Apr. 4.

REPORT ON JAPAN—Recommendations as to what Japanese industrial facilities should be removed for reparations and what should be retained for use in the Rising Sun economy have been submitted (p. 53) to the Army by a group of American engineering and appraisal firms.

SIGNS OF THE TIMES—Burroughs Adding Machine Co. expects (p. 60) to increase 1948 unit production by 50 per cent over 1947. . . . Rumors of an impending tieup between Packard and Nash (p. 58) recur in Detroit. . . . War Assets Administration (p. 52) has sold 32 steel plants, 4 blast furnace installations, 25 foundries and 8 forging plants since the war. . . . Requirements for farm machinery under the European Recovery Program are estimated (p. 52) at $136 million during the first 15 months.

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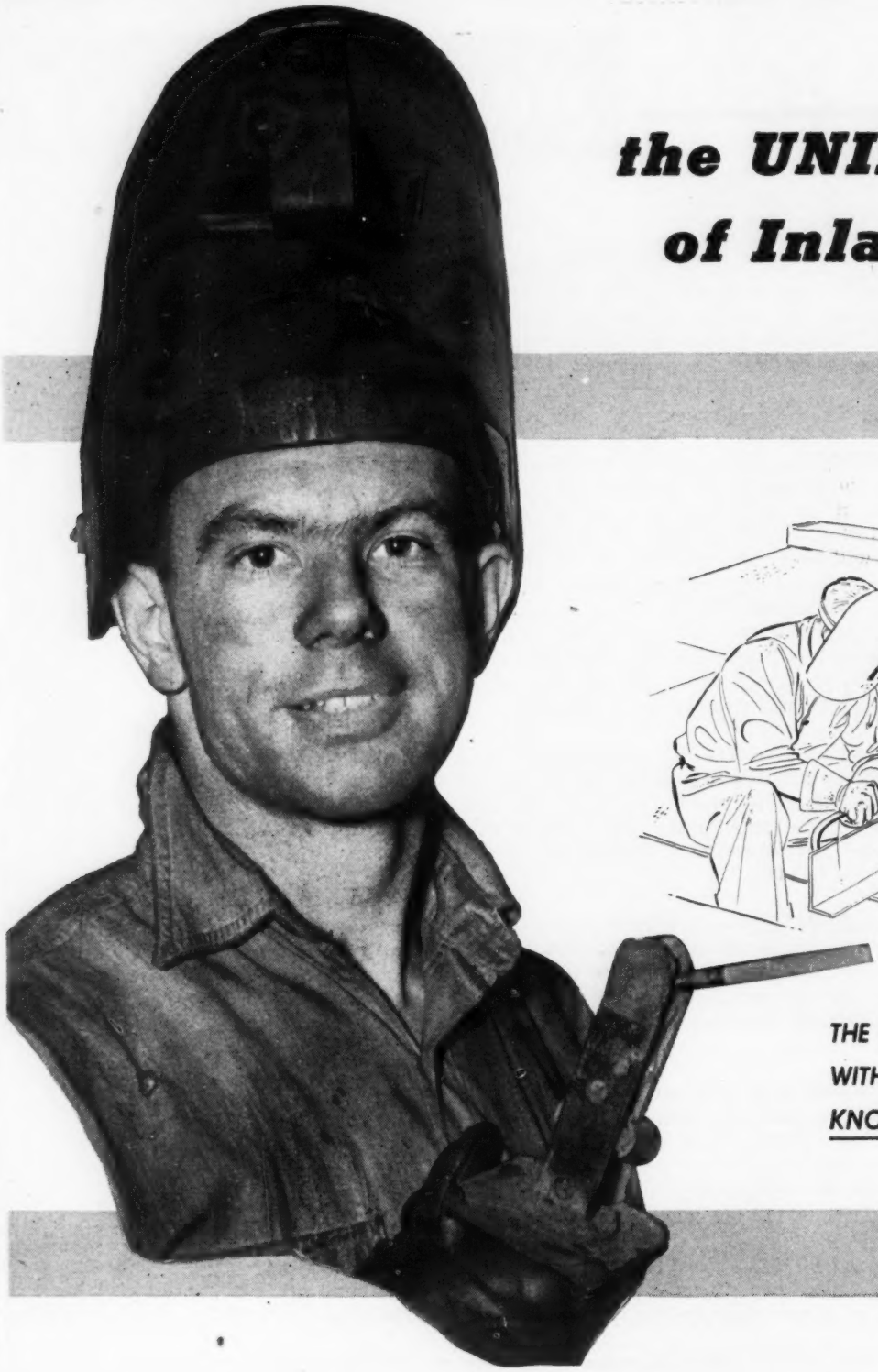

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Sharper Cutbacks in Steel Output Likely

Curtailments started as coal reserves dwindle. Fact-finding board, appointed by President, to report by Apr. 5. Injunction may then be asked against mine workers

For the sixth time since V-J Day, empty coal cars, such as these, have testified to idleness in the coal mines. NEA photo

MORE drastic cutbacks in iron and steel production are scheduled for this week as result of the continued idleness of most of the nation's soft coal mines. Last week, the second of the current mine suspension, witnessed only moderate curtailments as most steel producers kept facilities in operation in hope of an early settlement.

Late last week, prospects for quick return of the miners were not bright. John L. Lewis had rejected efforts of federal mediators to settle the dispute. President Truman had named a fact-finding board and given the board until Apr. 5 to report back. Then it is possible the government will seek an injunction against the striking miners.

The time permitted the fact-finding board—13 days— to make their investigation appeared unnecessarily long to coal operators, iron and steel producers and metalworking companies. Consensus was that the facts could be determined in much less time and that machinery to end the coal mine idleness set in motion much sooner. James D. Battles, executive secretary of the National Coal Association, termed the period allowed the fact-finding board "ridiculous" and said the board should have reported in a "matter of hours."

Cutbacks Start — Although most producers were able to operate through last week without major reductions, some coke ovens, blast furnaces and open hearths were taken off. The national steelworks operating rate dropped 3 points to 93 per cent of capacity. The coal shortage will be reflected in sharper reductions this week and drastic curtailments may be expected if the walkout continues into the week of Apr. 5.

Bethlehem Steel Co. took off 8 open hearths at Lackawanna, reduced blast furnace operations by the equivalent of two stacks and cut coking operations. At Johnstown, Pa., pig iron output was reduced by the equivalent of two blast furnaces, a bessemer was closed down, and open hearth and rolling mill schedules reduced. At Bethlehem, Pa., one blast furnace was banked, and several others put on reduced blast, and coke oven, open hearth and rolling operations reduced correspondingly.

Tennessee Coal, Iron & Railroad Co. removed four blast furnaces at Ensley, Ala., and shut down four open hearths and a rail mill. Woodward Iron Co. took off a merchant blast furnace, adding to the troubles of foundries in that area. Sloss-Sheffield Steel & Iron Co. is operating on a day-to-day basis.

Columbia Steel Co. shut down two batteries of coke ovens on the West Coast. Geneva Steel Co. banked one blast furnace and placed two on reduced wind. One open hearth was taken off. At Ironton, Utah, coke ovens were cut back to 50 per cent of capacity.

Carnegie-Illinois Steel Corp. banked one blast furnace at Duquesne Works, adversely affecting the supply of merchant iron.

At Youngstown, steelmaking operations dropped 5 per cent. Youngstown Sheet & Tube Co. took off a blast furnace for relining. Sharon Steel Corp. banked one stack and closed down 5 open hearths.

At St. Louis, coking operations were cut back about 20 per cent.

Effect on Consumers Delayed—Few metalworking companies have been able to build up substantial inventories of finished steel and any reduction in steelmaking and rolling operations will be reflected in curtailed production and reduced employment in the steel-using industries.

This effect will be somewhat delayed, possibly until after the coal dispute is settled. For the time being, metalworking companies will continue operations until their inventories become depleted or so unbalanced as to necessitate a halt. Then many will

find it necessary to close for a period for rebuilding stocks of steel.

Should the coal strike last a month or more its effects will be felt by the metalworking companies throughout the remainder of the year. Shutdowns for lack of material may be common during the late spring and summer months, a direct if belated effect of the miners' walkout.

To an extent the effect of the coal strike on primary steel production also is delayed. For the first two weeks of the coal stoppage most producers have been able to maintain production at a high rate. Should blast furnaces and coke ovens be closed for want of coal, however, two to three weeks will be required after the mines reopen to get these facilities back to normal production. Meanwhile rolling mill schedules will have been disrupted.

Foundries Affected — Among the first companies to be affected by the mine closing are the foundries. These shops have been critically short of both pig iron and coke in recent months. Inasmuch as coke ovens and blast furnaces are the first facilities to be closed down after coal shipments stop, the supply problem for the casting shops is obvious. Even if stockpiled coal is available for coking, foundries say this results in a poorer grade of coke.

Some curtailment was reported by foundries in the eastern, midwestern and southern districts last week and further cuts were expected to be made this week.

Lewis' Tactics Puzzling — Coal, steel and metalworking men are shaking their heads in puzzlement over the whys and wherefores of John L. Lewis' strategy in causing a work stoppage at this time. The alleged dissatisfaction over the failure of the trustees to activate the miners' welfare fund does not appear sufficient basis for the walkout in itself, especially in light of the operators' offers on this issue.

Some observers believe Lewis is causing the mines to be idled at this time deliberately to reduce coal stocks of leading consumers. Then, they conjecture, Lewis will be in a better bargaining position when he presents his third round wage demands late in June or early July.

Conservation Measures Start—To conserve stocks of coal above ground, the Interstate Commerce Commission has ordered a 25 per cent reduction in use of coal-burning locomotives for freight service beginning Mar. 30. Passenger service by coal-burning locomotives was cut 25 per cent last Monday. At that time an embargo of coal shipments for exports also became effective.

SHIPMENTS OF STEEL PRODUCTS IN JANUARY

Steel Products	Number of Companies	Items	JANUARY - 1948			Whole Year 1947		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	42	1	299,585	5.5	238,598	3,089,121	4.9	2,273,970
Structural shapes (heavy)	12	2	334,476	6.2	2,643	4,436,129	7.0	2,640
Steel piling	4	3	23,143	0.4	6	324,224	0.5	23
Plates (sheared and universal)	29	4	529,897	9.8	34,263	6,345,216	10.0	219,227
Skelp	5	5	12,307	0.2	45,438	160,989	0.3	384,004
Rails—Standard (over 60 lbs.)	4	6	172,285	3.2	1,796	2,207,146	3.5	991
—All other	5	7	28,613	0.5	189	211,900	0.3	329
Joint bars	7	8	10,723	0.2	1,931	173,923	0.3	15,198
Tie plates	7	9	40,372	0.7	-	504,779	0.8	4,437
Track spikes	7	10	10,545	0.2	-	163,746	0.3	146
Hot Rolled Bars—Carbon	31	11	520,965	9.6	59,078	6,242,416	9.9	745,770
—Reinforcing—New billet	14	12	105,840	2.0	590	1,277,075	2.0	9,775
—Rerolled	11	13	9,976	0.2	-	175,833	0.3	-
—Alloy	23	14	158,238	2.9	15,601	1,741,452	2.7	212,382
—Total	42	15	792,019	14.7	72,269	9,436,756	14.9	967,927
Cold Finished Bars—Carbon	27	16	115,989	2.1	266	1,426,701	2.3	9,249
—Alloy	25	17	17,099	0.3	307	218,808	0.3	2,601
—Total	32	18	133,088	2.4	573	1,645,509	2.6	11,850
Tool steel bars	18	19	6,649	0.1	91	87,279	0.1	1,670
Pipe & Tubes—Butt weld	16	20	158,799	2.9	2,112	1,892,691	3.0	78,084
—Lap weld	8	21	30,065	0.6	-	389,762	0.6	870
—Electric weld	12	22	133,197	2.5	320	1,254,325	2.0	4,274
—Seamless	16	23	218,068	4.0	12,978	2,581,106	4.1	157,208
Wire rods	19	24	63,247	1.2	28,342	667,282	1.1	331,192
Wire—Drawn	39	25	228,982	4.2	15,400	2,590,963	4.1	181,783
—Nails and staples	17	26	68,954	1.3	1,373	799,436	1.3	8,481
—Barbed and twisted	14	27	22,578	0.4	2	256,991	0.4	128
—Woven wire fence	12	28	34,645	0.6	182	407,295	0.6	3,616
—Bale ties	11	29	10,169	0.2	-	119,917	0.2	-
Black Plate—Ordinary	9	30	62,623	1.2	-	801,745	1.3	2,333
—Chemically treated	1	31	486	-	-	19,252	-	-
Tin and Terne Plate—Hot dipped	8	32	138,787	2.6	15	2,093,149	3.3	228
—Electrolytic	9	33	128,528	2.4	24	1,617,659	2.6	529
Sheets—Hot rolled	51	34	683,413	12.6	54,104	7,891,798	12.5	578,426
—Cold rolled	16	35	571,583	10.6	2,484	5,504,578	8.7	28,498
—Galvanized	16	36	129,184	2.4	116	1,609,881	2.5	889
Strip—Hot rolled	20	37	145,771	2.7	30,143	1,740,085	2.7	308,655
—Cold rolled	33	38	146,318	2.7	2,591	1,613,005	2.6	28,030
Wheels (car, rolled steel)	7	39	26,126	0.5	193	356,873	0.6	2
Axles	5	40	15,435	0.3	59	185,019	0.3	53
All other	-	41	-	-	-	-	-	-
Total steel products	140	42	5,410,438	100.0	351,235	63,179,523	100.0	5,595,392

Iron Ore Stocks Critically Low

CLEVELAND

STOCKS of iron ore on hand at furnaces and Lake Erie docks are at the lowest level for any comparable period in history, totaling only slightly over 15 million tons. Any delay in opening of the lake shipping season due to ice conditions or to a lack of coal would result in an acute ore shortage within a few weeks.

Coast Guard's ice breaker has released several ore carriers from Buffalo and other lower lake ports and will assist vessels in breaking through the ice barriers in the upper lakes as soon as practicable. While an early opening of the season is hoped for by lake shippers, it will not be the earliest, 792,602 tons having been brought down in March, 1942, the year which holds the tonnage record.

Ice in western Whitefish Bay is solid, 22 to 40 inches in thickness, and increasing, the Navy's branch hydrographic office at Duluth reports. Heavy windrowed ice extends into the lake beyond vision from Whitefish Point and southeast into the bay. Duluth harbor ice is solid and 22 to 24 inches thick.

Stocks Down—As reported by the Lake Superior Iron Ore Association, stocks on hand as of Mar. 1 totaled 22,628,022 tons, compared with 29,081,189 tons on Feb. 1 and 24,316,980 tons as of Mar. 1, 1947. The lowest level recorded for Mar. 1 previously was 22,418,000 tons in 1937, but consumption was at a lower rate that year so that stocks declined only to 17,437,000 tons by Apr. 1.

Of the Mar. 1, total, 18,555,360 tons were at furnaces in the United States, 856,405 tons at Canadian furnaces, and 3,216,257 tons on Lake Erie docks in the United States.

Iron ore consumption totaled 6,140,586 tons in February, compared with 7,056,667 tons in January and 6,264,284 in February, 1947.

A net gain of two furnaces in blast in this country was made in February, 173 being in blast as of Mar. 1 with only 9 idle compared with 168 in blast and 15 idle a year ago. In Canada, 9 furnaces continued in blast with 1 idle as of Mar. 1 and Feb. 1, compared with 8 in blast and 2 idle a year ago.

At the opening of navigation this year, the lake fleet will consist of 272 vessels of United States registry and 40 Canadian vessels, according to M. D. Harbaugh, secretary, Lake Superior Iron Ore Association. Of the Canadian vessels, 16 are largely devoted to the ore trade and the bal-

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WAA Seeking To Close Out Its Tool Surplus

MOVE is under way by the War Assets Administration to place all new offerings of machine tools and industrial equipment on a competitive bid basis. This action is being taken to assure complete offering of residual machine tools by June 30.

Only about 10 per cent of the total surplus machine tool supply will remain in inventory after completion of the Army-Navy industrial reserve.

Total surplus machine tool inventories consisted of more than 200,000 tools which cost the government more than $1 billion, but there now remain only about 64,000 tools with an acquisition cost of approximately $288 million. The Joint Army & Navy Machine Tool Committee will acquire for the national stockpile approximately two-thirds of these tools, leaving a residual of about 20,000 tools.

Fixed Price Sale Ends — Present sales of individual tools at fixed prices will end by Apr. 4. New offerings will be on a competitive bid basis after tools are screened by the Joint Army & Navy Committee for the national stockpile. The tools to be disposed of by this method of sale are generally in O-4 condition or lower —special and single purpose type and standard machine tools more than 10 years old.

Tools selected by JANMAT and released to users will bear a new price schedule. If tools are not purchased at the new prices, they will be returned to the national stockpile.

The new price schedule is as follows: N-1 at 90 per cent of acquisition cost; N-2 at 85 per cent; N-3 and/or O-1 at 80 per cent; O-2 at 70 per cent; O-3 at 60 per cent.

Machine tools will be first offered on a competitive bid basis as individual tools with a 30-day inspection period. Any residue from the first sale will be lotted with other residual tools and sold on a tonnage basis.

During initial offerings, priority rights will be recognized on individual tools. Residuals then will be disposed of in lots to all classes of buyers.

Lustron Corp. Places More Equipment Orders

Lustron Corp., Columbus, O., has placed additional orders of $814,757 for plant equipment for producing porcelain enamel homes. Purchase orders placed with other industries during the past three months now total $6,265,413.

Manufacturers of enameling equipment received orders totaling $496,599, bringing total orders placed for enameling purposes to $2,965,530. Presses ranging in capacity from 25 to 1800 tons and costing $2,026,146 are second on the list of orders.

Metalwash Machinery Co., Irvington, N. J., got orders for enameling equipment totaling $354,973 to lead the list of latest purchases by Lustron. Carlin Tool & Die Co., Detroit, received additional orders for $129,255. Albert J. Boland Co., St. Louis, was awarded $113,009.

Other firms receiving new orders included: Warren City Mfg. Co., $63,981; Danly Machine Co., Chicago, $26,117; Struthers-Wells Co., Titusville, Pa., $47,848; Mardigan Corp., Detroit, $23,100; Wille Tool Co., Chicago, $2605; Harig Mfg. Co., Chicago, $795; Superior Tool & Die Co., Columbus, O., $1000; Castaloy Corp., Detroit, $7475; Banner Die, Tool & Stamping Co., Columbus, $435.

Also Valley Machine Co., Dayton, O., $900; Mutual Tool & Die Co., Dayton, $3423; Kaywalt Mfg. Co., Dayton, $8270; Lincoln Engineering & Tool Co., Dayton, $3546; Mathews & Bartels Inc., Dayton, $1976; East Dayton Tool & Die Co., Dayton, $12,215; Monarch Die & Engineering Co., Dayton, $16,437; City Engineering Co., Dayton, $2845; Majestic Tool & Die Co., Dayton, $790; Federal Machine & Welder Co., Warren, O., $17,150; Chicago Vitreous Enamel Products Corp., Chicago, $1513; Patterson Foundry & Machine Co., East Liverpool, O., $463; Despatch Oven Co., Minneapolis, $19,974, and Conveyors Systems, Chicago, $6667.

Tucker Buys Engine Firm for $1,800,000

Tucker Corp., Chicago, has purchased Aircooled Motors Inc., Syracuse, N. Y., from Republic Aviation Corp. for $1,800,000.

"With this purchase," said Preston Tucker, president of the Chicago firm, "large-scale production of engines for the Tucker-48 will begin. We hope to reach 100 engines a day within the next several weeks."

Present, Past and Pending

■ PAY INCREASE ENDS STRIKE AT DISSTON PLANT
PHILADELPHIA—Nineteen-day strike at plant of Henry Disston & Sons Inc. ended last Wednesday with its 2500 employees receiving a compromise across-the-board pay increase of 10 cents an hour.

■ HALTING OF WAR SURPLUS SALES CONSIDERED
WASHINGTON—Defense Secretary James V. Forrestal told a Senate committee last week he is considering ordering a halt to further disposal of government-owned surplus war materials.

■ NEW ORDERS FOR MACHINE TOOLS DECLINE
CLEVELAND—New ordering of machine tools declined in February, index of the National Machine Tool Builders' Association registering 134.9 per cent of the 1939 average, compared with 146.3 per cent in January. With cancellations and shipments increasing, order backlogs fell.

■ FAIRCHILD ELEVATES J. C. WARD TO CHAIRMANSHIP
NEW YORK—J. Carlton Ward Jr. last week was elevated from president to chairman of Fairchild Engine & Airplane Corp., and Lawrence B. Richardson, formerly vice president of Curtiss-Wright Corp., became Fairchild president. Mr. Ward will continue as chief executive officer.

■ INDUSTRIAL DIAMONDS SOUGHT FOR STOCKPILE
LONDON—A deal whereby the United States government will acquire a substantial quantity of industrial diamonds from Diamond Corp. was reported near conclusion last week. They would be added to the U. S. government's strategic stockpile.

■ REPUBLIC TO EXTEND USE OF HIGH TOP PRESSURE
CLEVELAND—Republic Steel Corp. will apply its recently developed high top pressure blast furnace blowing technique to five additional furnaces this year, increasing pig iron capacity almost as much as if another furnace were built.

■ FABRICATED STRUCTURAL STEEL SHIPMENTS LOWER
NEW YORK—Estimated total shipments of fabricated structural steel in February declined to 135,710 tons from January's 144,315 tons. New orders also receded, amounting to 127,911 tons in February.

"Must" Controls Given 50-50 Chance

Expanded military program shaping up under new national defense policy thought likely to necessitate reimposition of some government restrictions on the economy

IMPOSITION of mandatory economic controls in the near future is given a 50-50 chance in Washington as the tempo of defense plans is stepped up in the tense international situation.

Voluntary allocation of steel and other critical materials will be inadequate in event military demands increase as expected in the opinion of observers.

Already signs of expanded military requirements are appearing. Demand for alloy and special steels is showing renewed vigor after months of relative quiet and expectations are Army, Navy and Air Force needs for all grades of steel will expand steadily from now on. Some observers estimate that national defense, the European aid program and pressing domestic requirements, such as railroad cars, may account for from 25 to 35 per cent of total steel production before very long.

Military Appropriation—Just what the military plans in the way of material and manpower remains to be disclosed. However, additional military appropriations up to $3 billion for fiscal 1949 are being sought, bringing the total for such appropriations for that year to around $14 billion.

Plans under consideration include the building of new jet propelled airplanes to replace wartime planes, several new or improved weapons for the Army, and modernization of naval craft. Both short range and long range programs are contemplated.

Impact of this prospective increased demand on the steel and other metal and material markets is not hard to appreciate. Most observers think the voluntary allocations program would be wholly inadequate to cope with the scramble for supplies which would be bound to accompany a substantial rise in military demands. In such circumstances what would be more logical than that the government turn to mandatory allocation?

Stage Being Set—Already wrestling with the President's demand for approval of universal military training and temporary revival of Selective Service, Congress is about to be confronted with demands for substantial stepping up of defense production—and Speaker of the House Martin is authority for the assurance that "Congress will give the military forces the tools they need for the national defense."

It is taken for granted by informed officials in the government that it will not be long before President Truman will press more insistently for full controls—over use of materials, and over prices and wages.

Voluntary Allocations—Some progress has been made in effecting the voluntary materials allocations program authorized under Public Law 395. However, this program has not moved ahead as rapidly as had been hoped and in some directions resistance to it has been evident. Only recently the farm equipment manufacturers turned down a proposal that they accept voluntary allocation of steel, and a Commerce Department official told STEEL at that time that the voluntary allocation program depends entirely on co-operation of industry, and that if such co-operation is not forthcoming, the whole thing will fall down.

In other directions the voluntary program is being pushed more vigorously than early this year. The rail car program is going ahead; so are those for housing and petroleum.

Last week the Office of Industry Co-operation moved to enroll the steel warehouses in the voluntary allocations program. It will extend invitations early next week to representatives of the warehouses to attend a meeting in the Commerce Department approximately Apr. 21. The groups to be invited include the American Steel Warehouse Association, the National Wholesale Hardware Jobbers Association, National Wholesale Hardware Association, the Association of Steel Distributors of New York, and the Steel Distributors Institute of New York. By having all of these groups attend, the meeting will cover not only the warehouses handling finished rolled steel but also the distributors of nails and certain other housing items which have been causing trouble. An OIC spokesman told STEEL that "these distributors will not come down to Washington as applicants or possible beneficiaries of a steel allocation program. Rather they are being invited to the meeting with a view to asking them for suggestions as to how the steel supply

NEW COMBINE: This "straight-through" type combine with low, streamlined design is being produced by Woods Bros. Inc., Des Moines. It has a full 6-foot cut, is powered by a 20-horsepower engine. This newly introduced model can be adapted to many crops, which it cuts, threshes, separates and cleans. NEA photo

problem of small business can be solved.

Will Accept Program—Carbuilders, at a meeting last week with OIC, indicated their industry will accept the proposed voluntary allocations agreement covering steel for 10,000 new freight cars monthly plus 85,000 tons of steel monthly for repair of bad order cars.

Apparently the greater portion of this industry does not share the adverse views of some carbuilders, railroads and castings suppliers which were expressed at the public hearing on the proposed allocations program on Mar. 19. One of the moves which seems to have swung this industry over in favor of signing the agreement is the decision of Commerce Secretary Harriman to incorporate an escape clause which would permit any party to the agreement to withdraw at any time without prejudice.

It is hoped by the OIC that the industry will sign up quickly as the Department of Justice has set Apr. 1 as the date of expiration of its promise of anti-trust law immunity to parties to the old voluntary freight car program which was instituted at the beginning of 1947. Should the industry fail to act the existing arrangement covering allocations would expire, thus leaving the country without a car allocations program. In the meantime the trend is to get along on present allocations for freight cars and the pig iron producers' task committee has decided not to call for pig iron allocations for freight cars needs in second quarter.

Study Petroleum's Needs—OIC and Commerce Department officials now are studying the petroleum industry's steel requirements, estimated by the National Petroleum Council (STEEL, p. 141, Mar. 22), but merely in an exploratory way because the claimant agency, Interior Department's Oil & Gas Division, has not yet made any request or recommendation involving the industry's steel needs.

Last week both the soil pipe and pressure pipe industries met with the OIC and industry advisory committees were set up for each.

Tonnage Indefinite—John C. Virden, head of the Office of Industry Cooperation, last week said it is as yet impossible to figure the amount of steel that may be involved in the voluntary allocations program. In response to an inquiry by Walter S. Tower, president, American Iron & Steel Institute, he said "the increases over present consumption will be only a small percentage of total output." He stressed that the program is intended "to operate with a minimum of disruption to normal production and distribution."

Alloy Steel Demand Up Sharply

Rising defense needs watched as producers' order backlogs climb. Deliveries now extend into August. Steps being taken to increase output

CONTINUED high level industrial production and revival of national defense activity have expanded demand for alloy steel to the extent at least one major producer now has its alloy steel output at the highest level since the war.

While the recent increase in demand is attributed to several factors, the one being watched most closely is military preparedness. Last week Defense Secretary James Forrestal and the joint chiefs of staff submitted to the White House and Senate Armed Services Committee preliminary reports of stepped-up military preparedness plans. Under these plans additional appropriations up to $3 billion for fiscal 1949 will be requested, which might bring total military appropriations for that year up to $14 billion.

Short and Long Range Programs—Plans under consideration involve substantial new jet propelled planes to replace wartime planes, several new or improved weapons for the Army and modernization of naval craft. The plans contemplate both short range and long range programs.

As result of the surge in alloy steel demand, Republic Steel Corp. is increasing its output by confining most of its own electric furnace capacity at its Canton, O., works to alloy production and by putting into operation two large government-owned electric furnaces at its Canton facilities. Until the recent upturn in alloy demand, Republic had devoted some of its electric furnace capacity to production of carbon steel in an effort to help fill civilian requirements.

Uses Government Furnaces — To augment its own electric furnace capacity at Canton for alloy production, Republic is using the two government-owned furnaces on a tonnage-payment basis. Those two furnaces, along with three other large government-owned electric furnaces at the Canton works, have not been used since the war.

In connection with its increased alloy production, Republic is increasing its trained personnel in that department at Canton.

Switch of electric furnace facilities from carbon steel production to alloy has substantially reduced Republic's output of conversion ingots, with result the waiting list for such ingots has lengthened considerably.

Other Demand Up—In addition to defense requirements, other stimuli to the alloy business are needs of the automotive industry, diesel-electric locomotive builders, and some substitution of alloy steel for hard-to-get carbon steel. Diesel-electric locomotives, which account for approximately 95 per cent of all locomotive orders today, require considerably more alloy steel than steam locomotives. Bulk of alloy steel required for aircraft goes into engines.

Whereas alloy bars early this year could be had in five or six weeks, deliveries on some are now extended as far as July and August and the extension is continuing.

Indicative of the expansion of preparedness measures, one large steel producer has received inquiries concerning shell steel, while elsewhere there are evidences of orders for accessory parts for aircraft and Signal Corps equipment.

However, steel producers say they have not been notified of any immediate possibility of government ordering of war materiel, interest shown so far being confined largely to "feeler" inquiries for armor plate, stainless and certain alloys on the basis of what delivery could be furnished if the armed forces should initiate an elaborate procurement program. Producers state that in all instances they have replied that such orders would be immediately sandwiched into production schedules regardless of adverse effect on civilian economy.

At Dayton, O., increased activity in the Aircraft Procurement Division of the Air Materiel Command has been revealed. Officials there refused to comment, but spokesmen for aircraft companies with Dayton offices said top executives of their firms have been there conferring with AMC officials.

Warehouses Need Alloys—In anticipation of increased military preparedness with resultant enlarged demand for alloy steel, warehouses are reported attempting to build up their stocks of alloys.

Hot-rolled bars constitute the largest product tonnage-wise of alloy steel output. In the first 11 months of 1947, alloy steel production totaled 3,807,490 net tons, with hot-rolled bars accounting for 1,591,835 tons, or 42 per cent.

Manganese Causes Concern

Imports, stockpiling and development of domestic deposits attract new interest in light of international situation. Omnibus minerals bill preparation to start

WAR scare talk in Washington and the fact that this country's stockpile of manganese ore is sufficient for only about six months at the current rate of consumption are intensifying interest both in stockpiling foreign ores and in developing domestic deposits.

The bulk of manganese used in this country is imported, Russia, India, Brazil, Union of South Africa, Chile, Belgian Congo, Cuba, Gold Coast, Mexico, Portuguese Guinea and Angola being the chief suppliers.

The subcommittee on mines and mining of the House Public Lands Committee has been holding hearings on the matter and expects to get around to writing an omnibus minerals bill late in April.

"We must develop more information before we can undertake to write a good bill," Rep. William Lemke (Rep., N. Dak.), chairman of the subcommittee, told STEEL. "One witness told us that with $300 million in hand he can produce unlimited quantities of concentrated manganese from our low-grade deposits—and we want more light shed on that proposal. While we hope to be able to apply to the overall minerals program much of the information obtained during the hearings on manganese, we will also have to spend some time on the other critical and strategic minerals."

Seek Overall Policy — What the Lemke subcommittee has in mind is the establishment of a national policy toward minerals in general. That means writing a bill covering stockpiling policies, incentives to production, provision for large-sized exploratory programs, the development of mineral industries in this country, policy in respect to imports of minerals, provision for research work to permit utilization of low-grade minerals, etc.

"Because of future uncertainties, a national stockpile of suitable manganese ore is desirable," R. M. Lloyd, assistant to vice president in charge of raw materials, United States Steel Corp., told the subcommittee. Recently in some foreign areas "deterioration of rail operations as well as priority movement of other materials has been restricting the availability of foreign manganese to the United States. If these conditions continue, any endeavor to expand our imports is not likely to be successful.

"The stockpiling program," Mr. Lloyd continued, "could be used to encourage research in beneficiation of domestic low-grade manganese ore, and in the development of a larger domestic manganese ore industry, but at the same time no restriction should be placed upon the importation of foreign ore."

Stockpiling Essential—Should foreign manganese ore cease to come into the United States, there would quickly be a dire need for manganese and some action would have to be taken, August B. Kinzel, vice president, Electro Metallurgical Co., told the subcommittee. Stockpiling is essential for the national welfare, he said, but it must be borne in mind that foreign ores are not available in infinite quantities. Stockpiling, he said, must be based wholly, or at least partly, on new U. S. output.

"To win manganese ore from the Cuyuna and other deposits would take a lot of machinery, a great amount of man-hours and much additional material, including chemicals," said Mr. Kinzel. As to knowledge about utilizing low-grade domestic manganese ores, he went on, processes already have been developed for many of these ores, and they can be developed for the others.

Andrew Leith, vice president, E. J. Lavino & Co., concurred that stockpiling of manganese ore is necessary. If we had 20 years in which to stockpile foreign ore—that would be one thing. Under present circumstances, it is to the nation's best interests to find out how much domestic manganese ore we have and what can be done with it by way of processing. Then a set of specifications should be drawn up on the basis of what is available, and a stockpiling program launched in earnest. The foreign situation is not improving, Mr. Leith warned. The situation in India, he said, "is in the lap of the gods; the Indian outlook is unfavorable—with a shortage of labor, a shortage of transportation facilities, and other shortages."

Freight Rates High—F. A. Linforth, assistant to vice president, Anaconda Copper Mining Co., producer of more than 90 per cent of the country's domestic manganese ore, said this company has steel mill customers for every ton it can produce. In 1947, when domestic miners shipped 135,600 short tons of manganese concentrate, Anaconda's share was 129,020 tons. By persistent research work, Anaconda has evolved a process by which it ships nodules containing 60 per cent manganese. This helps meet its freight rate disadvantage—but not enough. The freight rate on a long ton of manganese concentrate from Butte, Mont., to Pennsylvania and West Virginia consuming points was moved up to $15.66 on Jan. 8, 1948, and now there is talk of a further increase. The rate from Baltimore to Pittsburgh, Mr. Linforth pointed out, is $4.20 per ton—or a difference of $11.46 per ton.

REP. WILLIAM LEMKE

As to reserves, Mr. Linforth said his company estimated it has some 2,500,000 short tons of natural ore—around 18 per cent—available for production.

Need High-Grade Ore—E. M. Wanamaker, president, Electro Manganese Corp., told the subcommittee that he was in disagreement with a claim that we can improve our manganese position by producing more electrolytic manganese from low-grade deposits. The electrolytic process requires commercial 48 per cent ore, and "will not work economically on 16 per cent ore," he said.

A big future for electrolytic manganese was foreseen by L. F. Weitzenkorn, superintendent, Metallurgical Department, American Rolling Mill Co.'s Rustless Division. New and expanded uses are being found continually for stainless steels whose production requires electrolytic metal containing 99.9 per cent manganese, including such items as jet engines and gas turbines which give promise of widespread future use.

Bethlehem Steel Co. has a manganese ore stockpile good for about 6 to 8 months' requirements, according to I. D. Simms, assistant purchasing agent. R. E. Garrett, executive assistant, Sloss-Sheffield Steel & Iron Co., estimated his company's stockpile as good for less than five months.

Lincoln Urges Incentives To Raise Output

EMPLOYEE incentives as a means of increasing productivity and of gaining sound economic and social improvements were urged by James F. Lincoln, president, Lincoln Electric Co., Cleveland, before the 295th regular meeting of the National Industrial Conference Board at the Waldorf-Astoria, New York, Mar. 18.

Mr. Lincoln warned against continuation of the present trend toward attempting social and economic improvements through expanding governmental control. Should this trend continue, he suggested, "some sort of paternal or dictatorial government will result that will try to legislate the creation and distribution of the material things of life."

The Cleveland industrialist was one of three speakers at the NICB session who discussed the general topic of "Morale, Productivity and Wages." Other speakers were O. A. Knight, president, Oil Workers International Union-CIO, and Theodore W. Kheel, director, Division of Labor Relations, New York City, the latter speaking in the place of Cyrus S. Ching, director, Federal Mediation & Conciliation Service, who was unable to attend.

Outlines Incentive Plan—Mr. Lincoln outlined the incentive program in operation at his plant, under which all workers are paid for what they produce and not the amount of time they put in. He said a method of job evaluation is used to set base rates and that all jobs are periodically reviewed to determine whether these rates stand in need of adjusting.

A worker-management committee meets every two weeks with the president. Promotion is always made from the ranks and regardless of seniority. At the end of each year the board of directors determines how much of the money that is left over after expenses and taxes is to be set aside for seed money and dividends, with the remainder of the profits to be distributed to employees as a year-end bonus.

He believed that some such system of appraising and rewarding men's performance, of keying that performance to low cost production and then passing the resulting economies on to the consumer in low prices must be adopted by industry in general "to replace the failure of legislative action," a failure he believed is now being witnessed.

Opposes Longer Work-Week—Mr. Knight believed industry can meet America's requirements and also give proper aid and assistance to the ravaged countries of the world without lengthening the normal work-week beyond the present 40 hours. He was confident that a lengthened work-week will add to the ranks of the unemployed and will reduce the efficiency of workers.

The speaker termed wage increases at this time as "absolutely essential and must be forthcoming if we are to have added and uninterrupted production."

Calendar of Meetings . . .

Apr. 5-8, Southern Machinery & Metals Exposition: Atlanta Municipal Auditorium, Atlanta.

Apr. 5-8, National Association of Corrosion Engineers: Fourth annual conference and exhibition at Jefferson Hotel, St. Louis. Association headquarters are at 67 Wall St., New York.

Apr. 7-9, Midwest Power Conference: Tenth annual meeting sponsored by Illinois Institute of Technology at Sheraton Hotel, Chicago. Stanton E. Winston is conference director.

Apr. 7-9, American Society of Civil Engineers: Spring meeting, William Penn Hotel, Pittsburgh. Society headquarters are at 33 W. 39th St., New York.

Apr. 7-9, American Gas Association: Sales conference on industrial and commercial gas, Windsor, Ont., Canada. Association headquarters are at 420 Lexington Ave., New York.

Apr. 12-14, Open Hearth Steel and Coke Oven, Blast Furnace and Raw Materials Committees, Iron & Steel Division, AIME: 31st annual conference, William Penn Hotel, Pittsburgh.

Apr. 14-17, Electrochemical Society: Spring convention in the Deshler-Wallick Hotel, Columbus, O. Society secretary is R. M. Burns, 235 W. 102nd St., New York.

Apr. 15-16, Metal Powder Association: Fourth annual spring meeting and exhibit, Drake Hotel, Chicago. Association headquarters are at 420 Lexington Ave., New York.

Apr. 15-16, American Zinc Institute Inc.: Institute's Galvanizers Committee will hold 20th meeting, in St. Louis at Hotel Statler. Institute headquarters are at 60 E. 42nd St., New York.

Apr. 16-17, Institute of Metals Division, AIME: Second annual New England regional conference, Hotel Taft, New Haven, Conn.

Apr. 19, American Society of Lubrication Engineers: National meeting, Buffalo.

Apr. 19-23, American Chemical Society: 113th national meeting, Stevens Hotel, Chicago. Society headquarters are at 60 E. 42nd St., New York.

Apr. 22-23, 1948 Machine Tool Forum: Hotel Statler, Buffalo.

Apr. 26-27, Association of Iron & Steel Engineers: Annual spring conference, Hotel Statler, Buffalo. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

Apr. 26-28, American Mining Congress: Annual convention, Cincinnati.

Apr. 26-30, American Management Association: 17th annual packaging exposition, Public Auditorium, Cleveland. Association headquarters are at 330 W. 42nd St., New York.

Power, Coal Shortages Hit Coast Plants

WEST Coast steel users who depend on northern California mills for their supply of semifinished and finished steel products are facing a two-way pinch.

On the one hand is the production curtailment forced on steel mills by the 20 per cent cut in electric power, ordered as an offset to effects of the serious drought in California. The other will be curtailment forced by the walkout of coal miners.

The electric power curb, which affects all industrial consumers in 46 California counties, means cutting one day's production out of each five-day week. Although steel mills have not disclosed how much tonnage reduction this has meant in their output, the effect is being felt increasingly by fabricators and other steel consumers who already have been seriously affected for many months by the shortage of steel products, especially sheets.

Western Mines Closed—If the coal miners' walkout is protracted, its effects would be even more serious. Both the Geneva and Columbia coal mines in Utah are closed, and the Geneva steel mills, which use their coal output, had only a two-week stockpile of coal on hand when the walkout began.

Columbia Steel Co.'s mills at Pittsburg and Torrance, Calif., use pig iron from Geneva and their production will be affected by any shutdown at Geneva.

Geneva coal mine employs 725 men, produces 5500 tons of coal daily. Columbia mine employs 275, produces about 1600 tons daily.

The Kaiser Fontana mill had a four or five weeks' stock of coal when the mine walkout began.

Foundries Hit—Meanwhile, more immediate effects of the coal walkout will be felt by foundries all along the West Coast. Next to the steel mills, they are the biggest users of coal through their coke consumption on the Pacific Coast.

Their supplies of coal on hand vary, ranging from two to three weeks at most foundries up to 30 to 60 days for others.

Other segments of West Coast industry are fortunate in that their operations are mostly based on oil or gas as a fuel instead of coal, as are most utility plants. Most railroads are powered by oil.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

American Iron & Steel Institute executives scheduled to testify in FTC steel case when hearing is resumed Apr. 6. Practically all companies submit price data

WALTER S. TOWER and George S. Rose—president and secretary, respectively, of the American Iron & Steel Institute—are slated to take the witness stand when hearings are resumed Tuesday, Apr. 6, in the Federal Trade Commission's steel case.

FTC spokesmen offered to hold the April hearings in New York if desirable for convenience, but Messrs. Tower and Rose agreed to appear in Washington.

The Apr. 6 date may be changed later to Apr. 13— depending on whether the Third Circuit Court of Appeals, Philadelphia, decides to hear arguments this summer in the Pittsburgh Plus case which FTC instituted against the United States Steel Corp. in 1924.

John C. Bane Jr., attorney for eight respondents in the steel case, also is counsel for the U. S. Steel Corp. in the Pittsburgh Plus case and, in the event the latter case finally is about to come up for argument, Mr. Bane would have to spend the week of Apr. 6 in preparation for such proceedings. All counsel participating in the steel case will receive due notice in case a postponement of the next hearing from Apr. 6 to Apr. 13 should be necessary.

Price Data Submitted — When the latest series of hearings in the steel case recessed Mar. 16, Trial Attorney Lynn C. Paulson announced that practically all the companies subpoenaed to produce price announcements and extra lists over the period May 7, 1935, through Aug. 19, 1947, had complied with the demand.

He reported a handful of companies not yet heard from had advised that their material either had been mailed or would be placed in the mail this week. The only exception is Bethlehem Steel Co. which has put in a part of its price record and asked until Apr. 15 to produce the rest.

Most of the 101 respondent companies put in their price data under written agreements with FTC counsel. Only the larger producers brought witnesses who were asked to establish the genuineness and authenticity of the price documents.

The steel men who appeared at the hearings for this purpose were J. D. Darby, general manager of sales, Carnegie-Illinois Steel Corp.; Adam Hazlett, vice president, Jones & Laughlin Steel Corp.; James P. Gill, vice president, Vanadium-Alloys Steel Co.; C. I. Collins, president, Superior Steel Corp.; William F. McConnor, vice president sales, National Tube Co.; Robin Garlick, assistant to vice president sales, Sharon Steel Corp.; H. M. Francis, vice president, American Steel & Wire Co.; John K. Beeson, executive vice president, Pittsburgh Steel Co.; Norman W. Foy, general manager of sales, Republic Steel Corp.; J. A. Ross and William E. Pennington, assistant sales managers, Crucible Steel Co. of America; C. H. Longfield, general manager of sales, Youngstown Sheet & Tube Co.; and Michael C. Schrader, assistant to vice president sales, Bethlehem Steel Co.

Economy Is Talked—But

Whereas everybody talks and urges "economy" in government, the average member of Congress is more keenly conscious of the many demands from all sorts of pressure groups for appropriation of public funds. It is rather unusual for anybody to appear before a committee and berate it for extravagance. Therefore, when Verbon E. Kemp, secretary of the Virginia Chamber of Commerce, appeared Mar. 15 before the Senate Appropriations subcommittee which is considering the Army Civil Functions bill, H. R. 5524, he gave the senators a jolt.

As the representative of over 3000 members "mostly small businessmen who are interested in the heavy taxes they have to pay," he said, he called upon the subcommittee to cut down the $606 million with which the bill had been loaded in the House. This is a poor time, with costs two and three times what they ought to be, to do unnecessary public work, he said, and he declared that most of the projects—all river and harbor improvements—could wait. He called the bill "one of the biggest pork barrels in history."

Job Legislation Studied

The House Committee on Education & Labor is planning to get into one of the pet projects of its chairman, Rep. Fred A. Hartley Jr. (Rep., N. J.), a study to ascertain what sort of legislation should be written to guarantee to a man his right to a job without being forced to join a union.

The first witness originally scheduled to be heard in January, is to be Cecil B. De Mille, Hollywood movie producer who was thrown off the air because of his refusal to pay a union assessment of $1 for a cause in which he did not believe.

This being an election year, the committee probably will not attempt to ram through a bill; however, it wants to compile a record for future reference. Mr. De Mille will testify before the committee Apr. 7, and other witnesses will follow.

Navy Yard Wage Rates

A bill which has been pushed by labor for several years has been introduced in the House by Rep. Homer R. Jones (Rep., Wash.) as H. R. 5850 and referred to the House Labor Committee. It provides that "the rates of wages of the employees in each Navy yard shall conform to those paid for comparable skill, experience and responsibility in private establishments in the general industrial area in which the yard is located, or in other industrial areas if comparable skill, experience and responsibility cannot be found in private establishments in such area."

The bill does not say so, but it would kill the authority given the Navy last year to use time-study methods in setting rates of pay. Mr. Jones, from Bremerton, Wash., where the Navy yard is the big industry, has asked the Navy for a report on how much, if anything, the provisions of the bill would increase the cost of operating Navy yards.

Oxygen Equipment Short

There is a dangerous shortage of oxygen generating capacity, and of equipment for generating and compressing oxygen, according to A. C. Barker, vice president, H. A. Brassert & Co., in a statement to the Subcommittee on Mines & Mining of the House Public Lands Committee.

Oxygen uses are growing rapidly and the gas will be needed on an immense scale in case of another war, he said. Where mostly gaseous oxygen was used in World War II the trend now is toward use of liquid oxygen which expands 800 times in

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Delivery Speed 120 feet per minute

Lengths are variable from 2 to 20 feet

Compact design minimizes floor space

Rugged construction insures continuous performance

Leveler capacity 16 gage to ⅛" thickness—**SAE** 1020 steel

Shear capacity 16 gage x 24" or ⅛" x 12"—**SAE** 1020 steel

Engineered for low cost high speed production.

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ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

assuming gaseous form. He recommended accumulation of a stockpile of liquid oxygen. He also recommended stockpiling small oxygen generating plants suitable for transportation by plane to wherever in the world they may be needed.

Subcommittees Appointed

Because of trouble in maintaining its timetable on tax and related legislation, the House Ways & Means Committee has followed the example of other congressional committees by appointing subcommittees which will shape up different bills simultaneously. As announced by Chairman Harold Knutson (Rep., Minn.), these subcommittees are as follows:

Subcommittee on Social Security: Reed, chairman; Woodruff, Kean, Curtis, Mason, Dingell, West, Mills and Lynch.

Subcommittee on Tariff & Reciprocal Trade: Gearhart, chairman; Simpson, Byrnes, Ellis, Goodwin, Doughton, Cooper, Gregory, Forand.

Subcommittee on Tax Revision: Jenkins, chairman; Martin, Grant, Holmes, Cooper, Camp and Eberharter.

Bureau Shift Delayed

Rejection by the Senate of the President's Reorganization Plan No. 1 followed the action of the House in disapproving this plan. It called for putting the United States Employment Service and unemployment compensation in the Labor Department—which by statute is biased on the side of labor.

Sen. Forrest C. Donnell (Rep., Mo.), who led Senate opposition to the plan, argued that economy and efficiency would be served by having these functions in the Federal Security Agency —but he felt that Congress should not order a shift until the commission headed by ex-President Hoover submits its report in 1949 on reorganization of the executive branch. For the time being, therefore, USES is temporarily in the Labor Department, to go back to FSA six months after the President and Congress have declared World War II to be officially ended. Unemployment compensation now is in the FSA.

Synthetic Fuel Proposal

Bill has been introduced in Congress which would authorize an additional $30 million for work on synthetic liquid fuel from coal and oil shale, agricultural and forest residues. The bill has an amendment which stipulates that $1 million of the total amount must be spent on research work to get out petroleum remaining in so-called exhausted oil wells. As soon as the actual appropriation is approved, presumably this spring, the Bureau of Mines will be in a position to go ahead with the various phases of the synthetic fuel program at Pittsburgh, Rifle, Colo., Louisiana, Mo., and Morgantown, W. Va.

ERP Farm Tool Needs Set

Requirements for farm machinery and equipment under the European Recovery Program are estimated at $136.3 million during the first 15 months of the project, according to Secretary of Commerce W. Averell Harriman.

This represents about 10 per cent of total United States production and is double the amount usually exported to the European area. Estimates of total ERP requirements of this nature for the entire program are placed at $545.1 million, with the $136.3 million set for 1948-49, $161.5 million for 1949-50, $131.8 million for 1950-51 and $115.5 million for 1951-52.

This schedule, Mr. Harriman added, has been set up despite the fact that last year the United States farm machinery manufacturers were unable to meet domestic and export demands and that output currently allocated for export represents roughly half of export orders.

Hopes that the schedule can be met, the secretary said, are based on the performance of the industry last year when it produced 50 per cent more dollar volume than in 1946 and on the expressed willingness of the steel industry to co-operate in channeling as much steel as possible to farm equipment makers.

LIGNITE POTENTIAL

Greater use of lignite in industry is sought by the Bureau of Mines. Little industries already have been built up on manufacture of activated carbon, brown pigments and creosote oils from lignite, and possibilities are seen for its utilization as a source of coal tar derivatives.

Of particular interest to the steel industry is possible use of lignite in reduction of taconite ores in the Lake Superior fields, approaches being made by using lignite both for heat and chemical energy. Blueprints for using high-hydrogen gas from lignite, and lignite char in attacking the problem have been prepared.

Lignite, extensively used for heating, has two disadvantages which must be overcome to enhance its usefulness. It must be dried and care must be taken to avoid spontaneous combustion. This means a market for dryers. Second, it must be upgraded and this means need for pulverizers, etc.

WAA Sells 32 Steel Plants

War Assets Administration has sold since the war 32 steel plants for $187,804,352; four blast furnace operations for $6,731,000; 25 foundries for $10,937,229 and eight forging plants for $3,663,422.

All told, WAA as of Feb. 16, 1948, had sold 87 surplus plants of all descriptions and had leased 26 others. Thirty-seven units remain on the market. Of these remaining, ten are steel plants, eight are forging facilities and the rest are in other categories. Virtually all of the steel properties left in WAA inventories are in process of being disposed of.

Patent Decision

Sharp restrictions on pricing through patent licensing agreements were imposed by the recent U. S. Supreme Court decisions in the U. S. Gypsum Co. case and Line Material Co. case. As a result of the decisions, parties to many patent agreements are somewhat puzzled as to just where they stand.

In the U. S. Gypsum case, the court held illegal the use of a patent as a device whereby a single patent-owner and licensees could fix prices on the output of an entire industry.

In the Line Material case, the court declared patent ownership does not permit two owners to cross license their patents and then fix prices on articles made by other manufacturers through the use of both patents.

Following the decisions, John F. Sonnett, head of the antitrust division of the Justice Department, warned that many companies may have to overhaul their patent license policies and practices.

Small Business Committee

The Senate on Mar. 15 extended the tenure of the Small Business Committee for the life of the 80th Congress and voted it additional funds in the amount of $50,000.

MACHINERY FOR BRITAIN: American soldier, member of the Tokyo military government, checks Japanese machinery marked for reparations settlement, with the assistance of a Japanese guard. This machine is destined for Great Britain. NEA photo

Urges Japs Retain Facilities

PROBLEM of restoring the economy of Japan to a self-supporting basis, even at the relatively low standards of 1930-34, is one of enormous difficulty, Overseas Consultants Inc., an organization of leading United States industrial engineering and appraisal firms, concludes in a report on Japanese reparations to the Department of the Army.

The group recommends against removal of productive facilities (except primary war facilities) which can be effectively used in Japan. Under the most favorable circumstances, the report said, restoration of Japanese economy will call for opportunity to produce a sufficient quantity of civilian goods for domestic consumption and for export in order to provide food and clothing for the rapidly increasing population.

Plants and facilities which should be retained in Japan and those which should be made available for reparations were determined by Overseas Consultants as follows:

Industry	Annual Capacity Designated for Retention	Annual Capacity Designated for Reparations
	(Metric Tons)	
Pig Iron	2,000,000	1,600,000
Steel Ingots	3,500,000	2,900,000
Steel Rolling	2,650,000	1,550,000
Aluminum Reduction	25,000	68,100
Aluminum Fabricating	.....	110,000
Magnesium	.....	680
Sulphuric Acid	3,510,675	1,245,075
Nitric Acid	30,295	106,945
Soda Ash	493,000	.....
Caustic Soda, Electrolytic	82,500	46,300
	(Gross Tons)	
Merchant Shipping	1,240,500	59,500
Shipbuilding	153,000	648,100
Ship Repair	4,526,490	2,693,350
	(Number)	
Machine Tool Manufacture	10,000	26,970
	(Yen)	
Ball & Roller Bearing	32,500,000	59,318,000

In addition, the following plants are recommended for reparations: Synthetic rubber, 900 metric tons; thermal power in grid system, 366,860 kilowatts, mainly generators without boilers. The following are recommended for retention: Thermal power in grid systems, 1,906,000 kilowatts; petroleum refining, 9,807,550 barrels; petroleum storage, 7,293,000. The value of these facilities designated for reparations was estimated at 990,033,000 yen (1939 rate) and would be in addition to primary war facilities, valued at 1,475,887,000 yen, or a grand total of 2,465,920,000 yen.

Decision on which productive facilities should be retained in Japan to permit her to achieve a self-supporting economy was influenced by the belief a strong industrial Japan would be less dangerous to the peace than continuance of the present state of economic maladjustment. Japan has large resources of low-grade coal and water power, but is lacking most raw materials needed for her industries. All her requirements of raw cotton, low volatile coking coal, and most of her petroleum and iron ore must be imported. Japan has virtually no raw materials to export and can produce a balance between imports and exports only by exporting the fruit of its abundant labor supply.

Taking into consideration increased population and other factors, it is estimated that in 1953 Japanese imports must be at least about 275 million in 1939 dollars more than in 1937 while exports will have to be around 415 million 1939 dollars more than in 1937.

Belgian Steel Output And Sales Score Gains

LIEGE, BELGIUM

Output and sales of iron and steel products continue satisfactory. Export markets are active and difficulties in renewing the commercial agreement with Great Britain have been resolved. It is expected a substantial tonnage of Belgian and Luxemburgian steel will be exported to Britain this year.

Production of pig iron and steel exceeds the postwar average. In January steel production reached a new postwar high at 312,000 metric tons. Pig iron output amounted to 305,690 tons.

In Luxemburg output is increasing. January pig iron production totaled 179,000 tons while steel ingot output was 166,000 tons.

Exports—During January exports showed improvement compared with December. This applies to exports in general as well as iron and steel.

Traces Rise of Steel Costs

U.S. Steel report shows wages, materials and equipment have advanced more rapidly than steel prices. Higher costs necessitate larger allowance for wear

HOW increasing steelmaking costs have outstripped steel mill prices is graphically told in the 46th annual report of United States Steel Corp.

Although the corporation's 1947 sales were twice those of 1929, last year's profit was $70 million less. Earnings in 1947 were $25 million more than in 1940, but in terms of purchasing power of the 1940 dollar the 1947 profit of $127 million was only $80 million, or one fifth less than in 1940, and this despite much greater production in 1947.

Earnings per dollar of sales in 1947 were relatively low at six cents. Higher earnings per dollar of sales were reported in 30 of the corporation's first 45 years.

However, the net income of $127 million was exceeded in only three previous years. Total sales established a new high at $2,122 million.

While steel prices (base) have advanced slightly less than 40 per cent since 1940, materials and services purchased by the corporation have advanced much more sharply.

Wages Up 80 Per Cent—Average hourly earnings of steelworkers now are 80 per cent higher than in 1940. A substantial portion of the increase in wages came during the war and early postwar years when steel prices were held under Office of Price Administration ceilings.

During 1947, wages, salaries and other employment costs accounted for 45 per cent of U. S. Steel's total costs and aggregated $903.6 million.

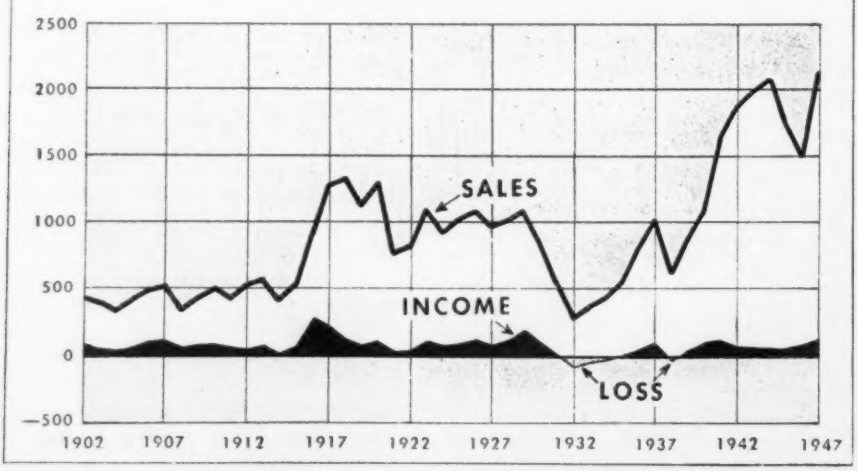
Equipment Costs Higher—Current construction and equipment costs likewise reflect the wage-price spiral. Citing purchases of identical equipment made in 1940 and 1947, the corporation reports that a blast furnace now costs 105 per cent more than in 1940; by-product coke ovens cost 150 per cent more; continuous rolling mill costs 84 per cent more; electric cranes are up 105 per cent; wire drawing machines have advanced 91 per cent; reheating furnaces are up 108 per cent; large electric motors cost 50 per cent more; concrete construction is up 124 per cent and brick construction costs 250 per cent more.

The cost of replacing existing tools and equipment and adding to plants and facilities continues to increase. A new cold-reduced sheet mill, authorized late in 1945 at an expenditure of $25,250,000, currently is estimated to have a final cost of $43,220,000, or 71 per cent more than planned. Additional tin plate capacity, authorized in 1945 to cost $13,250,000, currently is estimated to have a final cost of $19,542,000, or 47 per cent more.

General construction costs have advanced 79 per cent since 1940 and are continuing to push upwards. Merely to meet the increase in construction costs since original authorizations were made of facilities under way at the end of 1947, the corporation had to add $77 million to the original estimates.

U. S. Steel's Sales and Income — 1902-1947

Millions of Dollars



Materials Advance—Forty-two per cent of U. S. Steel's 1947 expenditures were for products and services bought. Practically all materials which the corporation buys show sharp advances in price.

Zinc ore, for example, costs 62 per cent more than in 1940; copper is up 77 per cent; tin has advanced 96 per cent; fuel oil is up 130 per cent; scrap costs 93 per cent more; and coke has risen 111 per cent.

Keeping Up with Increases—Recognizing that the price-wage spiral means that replacement costs will be much greater than original costs, U. S. Steel in 1947 increased its provision for wear and exhaustion by 30 per cent, from $87.7 million based on original costs to $114 million. This additional allowance, although not presently deductible for income tax purposes, represents the management's thinking as to what is advisable. Meanwhile, industry generally is awaiting accounting and tax acceptance of more realistic procedures for figuring wear and exhaustion of facilities.

Sets New Records—Productionwise, 1947 was U. S. Steel's best peacetime year. Iron output of 21,511,000 tons was bettered only during the war years 1941-44. Steel ingot production of 28,570,000 was a peacetime record. Finished steel shipments of 20,242,000 tons approached the best war years.

An all-time record was set in coke production at 20,806,000 net tons. Flux output also set a record at 24,827,000 tons. The corporation mined 47,434,000 tons of ores, a record for peacetime.

The corporation employed 286,316 workers, highest for any peace year. Hourly earnings by wage-earning employees set an all-time record of $1.55. Weekly earnings reached a peak average of $59.64 for the year, an increase of $9.73 over 1946. The total payrolls of the corporation amounted to $890 million and the man-hours worked totaled 574 million.

Research—Notable among long-range research and development activities of U. S. Steel in 1947 was the bringing into operation of new laboratory and pilot plant facilities for intensive study of improvement and beneficiation of the lower grade iron ores of the Mesabi range.

Studies of coal washing and blending practices to attain more effective removal of ash and sulphur and to provide better fuel for coking ovens were continued. Likewise, increased attention was given to recovery of coal chemicals from by-product coke ovens.

Open hearth, bessemer and electric

steelmaking practices were under continued study, with emphasis on speeding up all phases of these operations from the handling and charging of raw materials into the furnaces to the teeming of molten steel into ingot molds. This involved such diverse subjects as improvements in refractories and in furnace repair practices, improved methods of temperature measurement, use of oxygen as an aid to combustion and as a means of bringing molten steel more quickly to the desired carbon content, and many other problems.

In the rolling and finishing departments, corporation researchers directed attention to improvements in instrumentation for better control of high-speed continuous operations. A new stretch-reducing process for the production of small diameter seamless pipe was announced. A newly developed process for galvanizing steel in wide strip form has passed the experimental stage and is now in large scale operation.

Bethlehem Postwar Ingot Capacity up 900,000 Tons

Bethlehem Steel Co., Bethlehem, Pa., in its postwar expansion program has added 900,000 tons to its annual ingot capacity which, as of Jan. 1, 1948, is rated at 13,800,000 net tons.

When new construction authorized or in progress is completed, Bethlehem's expenditures for expansion since the close of World War II will have reached approximately $300 million. Included has been increased finishing capacities, notably for flat-rolled products. Since 1921 when its ingot capacity was only a little over 3 million tons, Bethlehem has increased this production more than four-fold.

Some of the major additions and improvements authorized and under way for 1948 include new steam generators at Lackawanna, N. Y., and Johnstown, Pa.; a 60,000-kw power station at Sparrows Point, Md.; machinery for production of cold bolts, nuts and rivets at Lebanon, Pa.; new coal preparation plants at Marianna and Ellsworth, Pa.; a blooming mill, bar mill and wire mill at Los Angeles; four soaking pits at Sparrows Point; improvements to iron and steel foundries at Bethlehem; blast furnace gas cleaning equipment and a new sintering plant at Johnstown; blast furnace at Sparrows Point.

Some of the major additions and improvements completed in 1947 at Bethlehem plants include a 10-in. continuous bar mill at Lackawanna; expansion and modernization of the tool steel department at Bethlehem; two new open hearth furnaces at Sparrows Point; improvements which consist of a new patenting furnace and other equipment at the rod and wire mill at Johnstown; additional equipment in the wire rope mill at Williamsport, Pa.; new 68-in. continuous hot sheet-strip mill at Sparrows Point; electric fusion weld pipe manufacturing shop at Steelton, Pa.

UNITED STATES STEEL'S FINANCIAL STORY—1902-1947

(Dollars in Millions)

Year of Oper.	Products & Services Sold	Employment Costs	Yearly Taxes Accrued	Products & Services Bought	Wear and Exhaustion	Interest & Other Costs on Debt	Income or Loss	Preferred Stock Dividend	Common Stock Dividend	Reinvested in the Business	% Income of Investment	% Income of Sales
1902	423.1	120.5	2.4	160.8	27.8	21.3	90.3	35.7	20.3	34.3	7.6	21.3
1903	398.2	120.8	3.0	164.1	29.3	25.6	55.4	30.4	12.7	12.3	5.4	13.9
1904	324.9	101.0	3.1	142.3	18.2	30.1	30.2	25.2	...	5.0	4.0	9.3
1905	409.2	128.1	3.6	151.1	28.0	29.8	68.6	25.2	...	43.4	6.4	16.8
1906	484.0	147.8	4.4	168.7	35.6	29.4	98.1	25.2	10.2	62.7	8.2	20.3
1907	504.4	160.8	5.4	169.1	35.1	29.4	104.6	25.2	10.2	69.2	8.3	20.7
1908	331.6	120.5	5.4	104.9	23.8	31.3	45.7	25.2	10.2	10.3	4.8	13.8
1909	441.1	151.7	8.7	138.4	31.8	31.5	79.0	25.2	20.3	33.5	6.8	17.9
1910	491.8	175.0	9.2	157.1	32.5	30.6	87.4	25.2	25.4	36.8	7.1	17.8
1911	431.7	161.6	9.6	146.3	27.8	31.1	55.3	25.2	25.4	4.7	5.1	12.8
1912	533.9	189.6	9.8	214.3	33.4	32.6	54.2	25.2	25.4	3.6	5.1	10.2
1913	560.8	207.5	13.2	191.6	34.0	33.3	81.2	25.2	25.4	30.6	6.6	14.5
1914	412.2	162.7	12.6	153.7	26.6	33.2	23.4	25.2	15.2	17.0d	3.2	5.7
1915	523.7	177.3	13.6	189.8	34.3	32.8	75.9	25.2	6.4	44.3	6.1	14.5
1916	902.3	263.9	26.6	265.3	43.0	32.0	271.5	25.2	44.5	201.8	15.3	30.1
1917	1,284.6	347.9	252.3	345.9	83.3	31.0	224.2	25.2	91.5	107.5	12.1	17.5
1918	1,344.6	453.0	297.6	339.2	98.8	30.7	125.3	25.2	71.2	28.9	7.2	9.3
1919	1,122.6	479.7	81.6	364.5	89.9	30.1	76.8	25.2	25.4	26.2	4.8	6.8
1920	1,290.6	581.8	76.2	413.6	80.0	29.3	109.7	25.2	25.4	59.1	6.1	8.5
1921	726.0	333.2	37.7	249.9	40.1	28.5	36.6	25.2	25.4	14.0d	2.9	5.0
1922	809.0	323.4	35.8	334.7	47.1	28.4	39.6	25.2	25.4	11.0d	3.0	4.9
1923	1,096.5	470.4	55.1	377.4	56.9	28.0	108.7	25.2	29.2	54.3	6.0	9.9
1924	921.4	443.6	45.3	266.9	53.2	27.3	85.1	25.2	35.6	24.3	4.9	9.2
1925	1,022.0	458.2	50.9	333.6	61.6	27.1	90.6	25.2	35.6	29.8	5.1	8.9
1926	1,082.3	469.3	52.4	346.7	70.4	26.8	116.7	25.2	35.6	55.9	6.2	10.8
1927	960.5	412.7	46.3	323.1	64.4	26.1	87.9	25.2	49.8	12.9	4.9	9.2
1928	1,005.3	402.9	51.0	338.4	73.2	25.7	114.1	25.2	49.8	39.1	6.0	11.4
1929	1,097.4	410.2	55.0	350.0	69.8	14.9	197.5	25.2	63.8	108.5	9.9	18.0
1930	828.4	371.7	48.1	234.8	63.8	5.6	104.4	25.2	60.4	18.8	4.8	12.6
1931	548.7	258.4	34.2	187.2	50.4	5.5	13.0	25.2	37.0	49.2d	.8	2.4
1932	287.7	138.5	31.7	141.8	41.6	5.3	71.2d	20.7	...	91.9d	3.1d	24.7d
1933	375.0	167.9	31.7	161.4	45.3	5.2	36.5d	7.2	...	43.7d	1.5d	9.7d
1934	420.9	214.8	35.8	140.5	46.4	5.1	21.7d	7.2	...	28.9d	.8d	5.1d
1935	539.4	253.9	38.4	191.2	49.8	5.0	1.1	7.2	...	6.1d	.4	.2
1936	790.5	339.0	49.6	287.5	59.0	4.9	50.5	50.4	...	.1	3.2	6.4
1937	1,028.4	447.1	74.6	342.6	64.1	5.1	94.9	58.5	8.7	27.7	5.6	9.2
1938	611.1	294.4	37.5	228.3	50.3	8.3	7.7d	25.2	...	32.9d	.0	1.3d
1939	846.0	386.5	52.2	293.5	63.4	9.3	41.1	25.2	...	15.9	3.1	4.9
1940	1,079.1	464.3	68.1	358.3	72.6	13.6	102.2	25.2	34.8	42.2	7.0	9.5
1941	1,622.3	628.3	168.6	604.6	98.6	6.0	116.2	25.2	34.8	56.2	7.1	7.2
1942	1,863.0	782.7	201.3	673.4	128.2	6.2	71.2	25.2	34.8	11.2	4.5	3.8
1943	1,972.3	912.9	125.9	730.6	134.0	6.3	62.6	25.2	34.8	2.6	3.9	3.2
1944	2,082.2	957.2	105.8	814.4	139.0	5.0	60.8	25.2	34.8	.8	3.8	2.9
1945	1,747.3	825.5	66.8	670.1	123.4	3.5	58.0	25.2	34.8	2.0d	3.6	3.3
1946	1,496.1	704.5	69.1	560.4	68.7	4.8	88.6	25.2	34.8	28.6	5.6	5.9
1947	2,122.8	903.6	136.2	839.4	114.0	2.5	127.1	25.2	45.7	56.2	7.4	6.0

The data are in some respects necessarily approximate, and are based on the yearly earnings reported annually to stockholders without adjustment for surplus charges and credits except that the years 1942 and 1943 reflect renegotiation settlements made in the succeeding years. For example, taxes are as accrued before adjustments. Income before interest, but after all other charges, was used to determine the per cent income of investment. d denotes **deficit.**

Pittsburgh Steel Finished Products Emphasized

Pittsburgh Steel Co., Pittsburgh, continued its policy of increasing plant efficiency and extending a larger percentage of operations into finished products during 1947, according to President Joseph H. Carter in the recently released annual report of the company.

During the year, additions, improvements and acquisitions amounted to $4,700,909. Acquisitions included the purchase from War Assets Administration of the uncompleted blast furnace at Monessen, Pa. The company also acquired Johnson Steel & Wire Co. Inc. and Pioneer Steel Ball Inc. The Johnson acquisition extended Pittsburgh's operations in the fine gage wire field and provided an additional outlet for rods and wire manufactured by the parent firm, Mr. Carter said. Pioneer is another finished product manufacturer.

Operations during 1947 were not interrupted by serious labor difficulties and most of the departments of the mills worked at capacity. On many production units all-time records were broken during the year. Ingot production was at the rate of 94 per cent of capacity.

Pittsburgh and its subsidiaries had a consolidated net income for 1947 of $4,019,637. This compares with $46,635 earned in 1946 when plant shutdowns, occasioned by the steel and coal strikes, cut sharply into earnings.

MODEL 30H MAN-AU-TROL HORIZONTAL LATHE PRODUCES 3 IDENTICAL PIECES IN LESS TIME THAN NORMALLY REQUIRED FOR ONE

Meeting demand for lower production costs on between-center shaft turning work which calls for turning, grooving, facing and angle-turning, this new BULLARD Man-Au-Trol machine offers advantages never before found in horizontal lathes.

3 Identically-Tooled Spindles Cut Unit Costs

Turning out three finished pieces per cycle . . . with simplified tooling for rough and finish cuts, with Man-Au-Trol keeping tools cutting almost continuously . . . the BULLARD Model 30H Lathe not only outproduces three ordinary horizontal lathes but also reduces tooling costs.

Makes the Operator's Job Easier

The BULLARD Man-Au-Trol Horizontal Lathe has headstock and all operating controls conveniently located at the operator's right. Each of the three hydraulically-operated chucks is controlled by a foot treadle . . . leaving the operator's both hands free. Work and tools are always visible and easily accessible to the operator without reaching across tools or tool slide.

An Automatic All-Purpose Machine

Man-Au-Trol, *the automatic control that is as versatile as manual control*, makes this highly productive lathe an all-purpose machine. Quickly and easily changed over from one job to an endless variety of other jobs and convertible from automatic to manual operation at the turn of a single lever, it is practical for long or short runs.

Write for Literature

The unique combination of productivity, convenience, versatility and accuracy makes the new BULLARD Model 30H Man-Au-Trol Horizontal Lathe worth investigating. Complete specifications will be sent on request.

THE BULLARD COMPANY,
Bridgeport 2, Conn.

BULLARD
MAN-AU-TROL
MASTER OF THE MACHINE
HORIZONTAL LATHE
Model 30H

BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

New models of Mercury and Lincoln previewed. Show adaptations of postwar styling of competitors, plus original ideas. Details not to be announced until next month

DETROIT

SLICK new versions of Lincoln and Mercury passenger cars were fanfared here last Monday before an intimate gathering of several thousand dealers, distributors, press and radio representatives, scores of suppliers and hundreds of company officials. They are still "secret" until the dates of formal announcement—Apr. 22 for the Lincoln and Apr. 29 for the Mercury. Appearancewise, however, they are not secret to many who are exposed to this department each week and the reactions of assorted visitors to the showing were interesting.

Consensus appeared to be that the first of the new Ford series of cars can be recognized as embodying many of the "patterns" introduced earlier by other makers—Cadillac, Hudson, Kaiser-Frazer to name only three—plus of course some original ideas of Lincoln-Mercury stylists. Head-on, the Mercury shows considerable resemblance to the Buick, while the Lincoln suggests a little of the Cadillac styling. This is perhaps more than mere coincidence, for Mercury is shooting squarely for spirited competition with Buick-Olds-Pontiac, and Lincoln is aiming for a sharp battle with the big Cadillac, Olds and Buick models.

Loaded with Trimmings—Viewed from broadside, a modification of the Hudson technique of introducing a side body crease carried backward the length of the car from the top of the front wheel fender cutout is unmistakable, while window and windshield treatment is directed toward lowness and wideness, with curved windshield glass in the Lincoln. Both Mercury and Lincoln are really loaded with chrome and stainless steel moldings and trim detail, while the Lincoln pioneers the unusual stunt of recessing front headlamps into a chrome-lined housing.

Lincoln will offer two models, the standard and the cosmopolitan, differing principally in degree of embellishment. In about a year, the present Lincoln Continental will emerge from a complete redesign and be entered as Ford's bid for the ultra-swish trade. Beyond the fact that the two lines will include models covering the complete range from the medium-price class to the top-price jobs, nothing can be said on prices, since full costing has not been completed. Little doubt exists, however, that they will be slightly higher than the 1948 versions if for no other reason than the enormous tooling bill involved in the new manufacturing program.

Beyond this sketchy summary, the full technical story will have to wait a month. It should contain some surprises, even to the thousands who stepped on each other's toes around pilot models on display last week.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,277	366,205
February	400,577*	393,636
March		443,588
April		445,137
May		404,191
June		421,466
July		400,944
August		364,478
September		444,501
October		461,536
November		417,493
December		492,109
12 mos.		5,055,284

* Preliminary.

Estimates for week ended:

	1948	1947
Mar. 6	108,343	104,378
Mar. 13	114,689	105,496
Mar. 20	116,023	108,472
Mar. 27	110,000	100,355

Estimates by Ward's Automotive Reports

Production Loss Averted—Interesting report of how an anticipated loss of 30,000 tons of cold-rolled steel was cut to only 7000 tons comes out of the Ford steel mill, where a 45-day shutdown had been looked for incident to installation of a new strip welder for a new looping pit on the No. 2 pickling line in the cold mill. It meant interruption to pickling operations, and no outside source could be found to handle the work. It was finally possible to continue operations, with only a 12-day shutdown, by moving uncoiler equipment of the 500-foot line to the balcony of the mill building.

Movement of the uncoiler equipment to the balcony necessitated reinforcing the latter with 10 inches of concrete, since the uncoiler machine alone weighs 70,000 pounds. Meanwhile, pickling operation continued on No. 1 and No. 3 lines, even while dynamiting was being carried on for the new looping pit of the No. 2 line. Four pickling tanks on the line will be relined with high-temperature cement and brick, permitting pickling to be done at higher temperatures and with higher acid concentration, and also allowing the cascading of liquor from tank to tank. Improvements in pickling, along with the new strip welder and other incidental changes, part of a $1 million program, will save handling time, reduce waste of material and speed production on a tandem mill to the extent of about 5000 tons per month.

Forging Plant Innovations—New stock heating techniques, substitution of hot extrusion forming methods for many ordinary forging hammer or press operations and wide-spread use of salt baths for preheating and annealing are three of the principal innovations in the new forging plant which Ford is operating at Canton, O. A main cog in the new and expanded Ford production program, the Canton unit will turn out 100 different automotive parts, aggregating around 500 tons daily.

An example of revised forging techniques is in the case of front wheel spindles, produced by hot extrusion. A cylindrical blank is placed in a press, dies close and the part is "extruded" to final shape. All resulting flash is concentrated at one location and the part is made much closer to its final size, eliminating a considerable amount of machining and giving a part said to have 50 per cent greater fatigue life.

Three different methods of heating forging blanks are used—salt baths, induction heating and controlled atmosphere furnaces. Size and shape of the part, as well as the forging operation, determine selection of the heating method. On some parts, for example, it has been determined that a small amount of salt retained on the heated part actually may act as

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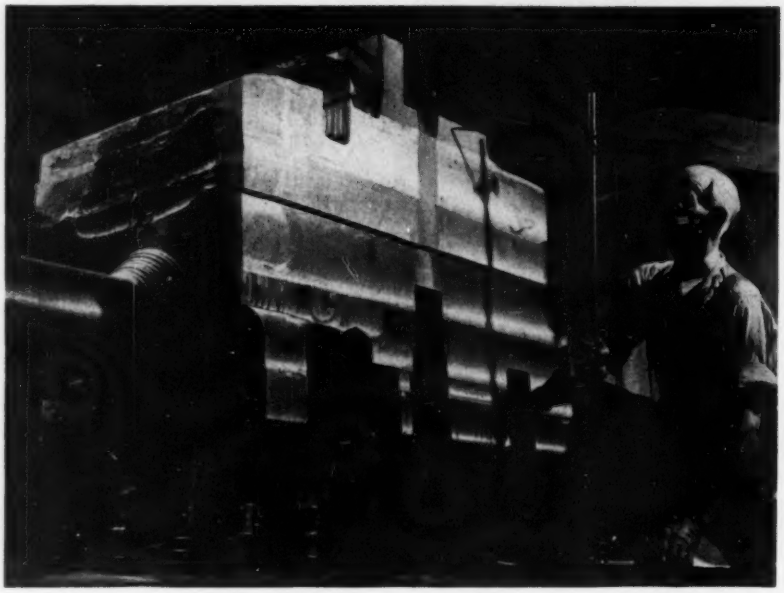


MAKE OWN FORGING: Delays in the production schedule of the 1949 Ford were averted when the blacksmith shop of the Ford Motor Co. turned out a 25-ton steel forging, largest ever attempted at the Rouge plant. Fast work was necessary to replace a broken bell crank on a large press. Photo shows a master toolmaker marking off the pattern lines

a die lubricant and increase die life. All three methods, of course, contribute to reduction of sealing.

After forging, parts are conveyed to a salt bath and held at constant temperature up to 45 minutes, after which they are quenched in water, thus obviating the need for any pickling. Heat of the parts coming from hammers and presses is sufficient to maintain temperature of the salt bath which in some cases may even require cooling to keep temperature constant.

Packard Veterans Retire

Retirement of Alvan Macauley as chairman of the board of Packard, along with Henry E. Bodman and Robert B. Parker, board members, marks the end of the era in the long and successful history of the company beginning in 1910 when Macauley joined Packard as general manager. He was named vice president three years later, president in 1916 and chairman in 1939. He also rendered valuable service to the industry at large, as president of what is now the Automobile Manufacturers Association, from 1928 to 1945.

Mr. Bodman has been director and general counsel since 1917, while Mr. Parker has served the company in various capacities for over 38 years, a director since 1931. All three are withdrawing "to grant younger men the broader opportunity of director responsibility," a statement which the industry prognosticators were trying to interpret as hinting the possibility of a merger between Packard and some other independent company or companies in the industry. Such consolidations have been discussed for the past 12 years at one time or another, in this writer's recollection, but the stumbling block always has been the top Packard directors who were said to want no part of any alliances. Names of three successors to the retiring Packard officers, being submitted to stockholders for consideration at the annual meeting Apr. 19, are W. Tom Zurschmiede, department store ex-executive, chairman of Federal Screw Works and Detroit banker; Henry C. Bogle, member of the firm of Packard's legal counsel; and Earle C. Anthony, Packard distributor in California since 1905, radio executive and second largest stockholder. There is hardly a clue in any of these associations which would point to a possible change in Packard's corporate setup. Nor is there any indication of who may become the new chairman of the board, since presumably George T. Christopher will continue as president.

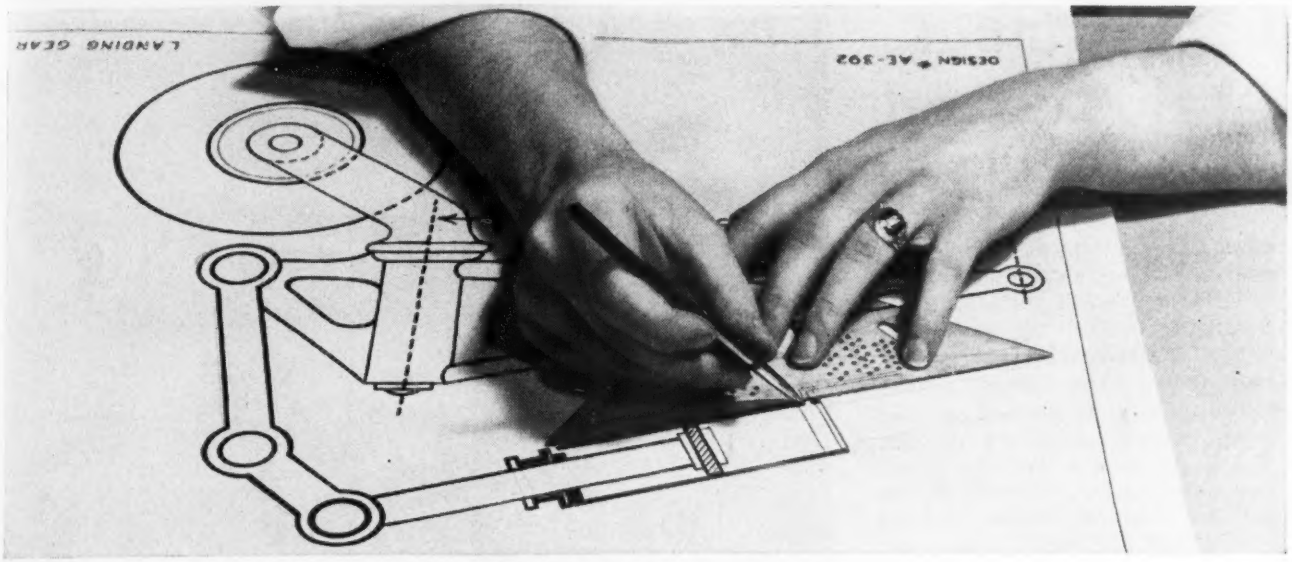
Tieup Rumored—In recent months there have been numerous tips fed out by columnists and others about a likely tieup between Packard and Nash. They originated probably as the result of an interchange of visits of production executives between the two companies, which were a fact, but had no connotations of any merger talk. Just at the moment it is difficult to see why Nash-Kelvinator would be much interested in joining with Packard, since it is doing more than all right in sales of motor cars and refrigerators. Some advantages would accrue in expanding dealer outlets and in giving dealers a wider price range of cars to offer. In other words, Nash would build the low-price line, both companies medium price units and Packard the high-price types. The situation at least bears watching, although a consummated marriage of the two companies doubtless would require a long engagement for mutual examination and financial preliminaries.

Analysis of Packard stock ownership shows 118,625 persons hold the company's 15,000,000 shares, no single shareholder owning more than 300,000 shares. Actually, only 6 per cent own 300 or more shares apiece. Shareholders live in 8000 communities of the 48 states, 63,328 men and 43,691 women. A total of 10,457 couples jointly own 1,013,992 shares, while 1149 institutions, banks, brokerage firms and other organizations hold 2,907,801 shares. From this wide diversity of ownership, the problem of acquiring a commanding voice in the direction of the company by virtue of stock interest would not appear as difficult as the simple contemplation of buying up a majority interest in 15,000,000 shares.

Transmission Developments

Oldsmobile publicists have coined a new one—"whirlaway"—to describe a fast-acceleration feature of the hydra-matic drive. Its technical significance is not made entirely clear, certainly it involves no new engineering feature in the transmission. Meanwhile, Buick was not to be caught napping transmission-wise. H. H. Curtice, general manager, told a group at Kansas City, Mo., recently that the dynaflow transmission offered on Buick this year is merely "the greatest engineering development in the automotive industry since the self-starter" (in his opinion of course), providing a combination of "steam-engine smoothness and power multiplication."

Chevrolet transmission specialists are now working with engineers of the General Motors product study section on the development of an automatic transmission for some future Chevrolet model, possibly 1951. It is reported to be the torque-converter type, similar to but not a replica of the Buick design. The dynaflow as now conceived is too heavy and costly for the smaller car.



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Begin Output At Homestead Valve Facility

CLIMAX of a $400,000 postwar expansion program was marked recently when Homestead Valve Mfg. Co., Coraopolis, Pa., formally began production of Hypressure Jenny steam cleaners in its new Coraopolis plant.

The facility for the Hypressure Jenny Division has over a thousand feet of conveyors as well as a motorized assembly line. Incoming materials flow from the freight cars and trucks right into the production and assembly lines with a minimum of handling.

Pipe Unloaded from Cars—Pipe for the heating units is unloaded from cars and stored beside the coil-winding machine so that it can be fed to the machine without additional handling. The coil-winding machine makes coils of three different diameters which then go to a series of welders who assemble the coils concentrically, adding braces and other parts which make a complete coil assembly.

Incoming chassis and parts are loaded on a conveyor by means of a small ramp which eliminates lifting. This conveyor carries the parts through a large Detrex washing machine which cleans all surfaces for painting. Upon leaving the washer, parts enter a Lanly drying oven which removes moisture left by the washing process. Paint is applied in two DeVilbiss waterfall-type paint spray booths, and parts then are carried through an overhead Lanly baking oven which dries the paint.

Parts Flow Synchronized — Upon emerging from the baking oven, parts, coils and chassis meet and are unloaded from their conveyors onto a motorized assembly line. Parts and sub-assemblies are made near the final assembly line, and channeled to racks from which workmen take them to install on machines moving toward completion. At the end of the assembly line each machine is put on a test rack and given a thorough test in actual operation.

In addition to this new 40,000 sq ft plant which has a rated capacity of 5000 steam cleaners a month, the company maintains its main plant and offices just west of Coraopolis and also a facility in Edgeworth, Pa. Pittsburgh architects, Prack & Prack, and consulting engineer Robert A. Wallace designed the new building and its equipment in conjunction with the Homestead Valve engineers. General contractor for the job was Rose & Fisher, Pittsburgh.

Waterfall-type DeVilbiss paint spray booth at the Homestead Valve Mfg. Co. plant in Coraopolis, Pa. Paint is sprayed on as parts pass along on conveyor

Belmont Steel Building New Chicago Warehouse

Belmont Steel Corp., Chicago and Franklin Park, Ill., has under construction a new warehouse and office at 9400 W. Belmont Ave., Franklin Park, a suburb of Chicago.

The new plant, of brick and steel construction and designed for the warehousing of sheet and strip, was started last July and will be completed in May.

At present, the company has a sales office at 4810 W. Jackson Blvd., Chicago, and occupies temporary plant space in Franklin Park. Equipment now in operation includes complete slitting, shearing, edging, leveling, deburring, flattening, straightening and decoiling machinery.

Bridgeport-Diamond Co. Formed in Connecticut

Bridgeport-Diamond Machine Co. has been formed by John T. Kilbride and has purchased the Diamond Machine Co., Philadelphia, from American Engineering Co. Sales and engineering offices have been moved to 2362 Main St., Stratford, Conn.

Manufacturing facilities to handle assembly and manufacturing will be in operation in the Bridgeport area within the next few months, Mr. Kilbride reports. The company will produce face grinders in various sizes using segmental grinding wheels up to 66 in. in diameter, as well as vertical surface grinders and a line of knife grinders for shear blades, paper knives and tobacco knives.

Mr. Kilbride until recently was president of Bridgeport Safety Emery Wheel Co. He has sold his interest in the firm.

Burroughs Expects 50% Unit Production Boost

Burroughs Adding Machine Co., Detroit, manufacturer of business machines and related products, expects 1948 unit production to increase 50 per cent over 1947 output with completion of an expansion and improvement program. The 1947 unit production was 45 per cent over that of 1946 and 19 per cent more than in 1941, best previous year.

Last year the company spent more than $2 million on new machines, tools, dies, fixtures and patterns. Expansion last year included purchase of a plant on Schaefer Highway, Detroit, which added 47,000 sq ft of area now devoted to manufacture of springs, motors and related products. Expansion in progress includes an addition to a factory at Plymouth, Mich., which will add another 158,000 sq ft of space. Also under construction is an additional floor to one of the main Detroit units.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Eagle-Picher Co., Cincinnati, producer of pigments, insulation materials and metallic products, has purchased the plant and other physical assets of Rockdale Insulation Co., Housatonic, Mass., for an undisclosed sum.

—o—

Meehanite Metal Corp., New Rochelle, N. Y., announces three foundries operated by I. G. Grawoig & Associates, Chicago, are now in production of Meehanite castings. They are American Well Works, Aurora, Ill.; U. S. Challenge Co., Batavia, Ill.; and Hercules Foundry Division of U. S. Challenge Co., Centerville, Iowa.

—o—

Ingalls Shipbuilding Corp., Birmingham, will undertake a $5 million reconversion job on the American President Lines' *SS Richardson*. The ship will be transformed into a luxury liner for use as a cruise ship to handle 539 passengers.

—o—

Ferro Enamel Corp., Cleveland, producer of vitreous porcelain enamels and allied products, has opened its new clay processing plant at Nashville, Tenn.

—o—

Electric Products Corp., Los Angeles, manufacturer of neon signs, has just completed a $500,000 factory in Los Angeles. Facility was designed and built by Austin Co., Cleveland.

—o—

Jones & Laughlin Steel Corp., Pittsburgh, is making a study of the possibility of moving greater steel tonnages by river. Last year 6.09 per cent of total shipments were thus transported, against 4.78 per cent in 1945. Truck shipments of the company's products in 1947 represented 23.99 per cent of the total, against 12.66 per cent in 1945.

—o—

University of Missouri has published two new bulletins dealing with stresses on the curved beam. They can be obtained upon request from Director of Engineering Experimental Station, University of Missouri, Columbia, Mo.

—o—

SKF Industries Inc., Philadelphia, reports that precision steel balls manufactured by its Atlas Ball Division are being made available in less than bulk lots in a new packaging program. Package quantities range from 350 balls of the smallest size, 3/32 in., to 25 half-in. and four one-in. balls, largest put up in this manner.

—o—

Housing & Home Finance Agency is sending drafts of a proposed uniform plumbing code for housing to groups in the construction field and urban localities for comment.

—o—

E. W. Bliss Co., Detroit, announces that its machinery sales and service headquarters for New England will be at 129 Church St., New Haven, Conn. Frank Beattie has been appointed district manager.

—o—

Vacuum Cleaner Manufacturers' Association, Cleveland, reports that factory sales of standard-size household vacuum cleaners in February totaled 311,342 units, compared to 304,273 in January, and were 14 per cent greater than the sales figure for February, 1947.

—o—

War Assets Administration is inviting proposals for an interim lease of the surplus alcohol plant at Kansas City, Mo., which was operated during the war by National Distillers Products Corp.

—o—

American Cladmetals Co. has moved its headquarters for all business to its plant on Arch St., Carnegie, Pa.

—o—

War Assets Administration has sold the surplus iron ore concentrating facilities at Iron Mountain, Mo., to Ozark Ore Co. for $340,000. Included in the sale are mining equipment and ore concentrating facilities.

—o—

Dravo Corp., Pittsburgh, has received an order from South African Steel Co., Johannesburg, for six crane cab coolers. Units will be installed on three soaking pit and three ladle cranes in the steel mill that is under construction for that company in South Africa.

—o—

Washington Aluminum Co. Inc., Washington, D. C., has begun production of ladders, gangways and other items fabricated from aluminum at a plant on Janney St. in Baltimore.

—o—

Los Angeles Chamber of Commerce reports that February manufacturing growth in the Los Angeles area had a value of $7,022,000 for 14 new factories and 37 expansion projects. The February aggregate was nearly double the figure for January.

—o—

Landis Tool Co., Waynesboro, Pa., manufacturer of precision grinding machines, has appointed B. L. Sylar & Son, 105 Belvoir Ave., Chattanooga, Tenn., as its distributor in Tennessee.

—o—

Diamond Alkali Co. has moved its general offices from Pittsburgh to Union Commerce Bldg., Cleveland.

—o—

Reynolds Metals Co., Louisville, Ky., has appointed Hamilton Steel Co., Cleveland, and Arthur C. Harvey Co., Boston, as distributors for its aluminum mill products.

—o—

Associated General Contractors of America Inc., Washington, D. C., has created a Department of Research, to be headed by Harry J. Kirk. Purposes of the department will be to study information on contract documents and specifications; uses and cost of owning construction equipment; and construction statistics.

—o—

Cutler-Hammer Inc., Milwaukee, manufacturer of electric control apparatus, has moved its Atlanta district sales office to 714 Spring St. N. W. G. E. Hunt is Atlanta district sales manager.

—o—

Hewitt Rubber Division, Hewitt-Robbins Inc., Buffalo, has appointed Penn Central Equipment Co., Altoona, Pa., as a distributor of Hewitt's line of industrial rubber products.

—o—

Allis-Chalmers Mfg. Co., Milwaukee, reports that it has under development a mobile gas turbine plant to be used as a compact, easily moved, short-notice source of emergency electric current.

—o—

General Electric Co., Schenectady, N. Y., has inaugurated a service to supply electrical conduit assemblies made up to the specifications of individual equipment manufacturers.

—o—

Wiremold Co., Hartford, Conn., announces that it guarantees the prices on its raceway fittings and lighting units until June 30, 1948. The company also states that it hopes its prices need not be increased after that date.

—o—

Franklin Railway Supply Co., New York, is manufacturing and selling overfire air jets with mufflers, developed by Bituminous Coal Research Inc. to reduce smoke nuisance in the steam locomotive.

The Business Trend

CUTBACKS in industrial activity as the consequence of the coal miners' work stoppage were but slightly reflected in the latest week's production figures. STEEL's index of industrial production for the week ended Mar. 20 edged downward only one point from the previous week to 166 per cent (preliminary) of the 1936-1939 weekly average. Lower operations in those fields which promptly showed the effects of inactivity at the coal pits were offset by production gains in other basic industries.

STEEL—A half point advance in the ingot rate occurred in the week ended Mar. 20, bringing operations up to 96 per cent of capacity. Mills generally are keeping furnaces at maximum production in hopes of a quick settlement of the coal dispute. Increased steel requirements for defense measures appear in prospect, adding to the overall tightness in supply.

AUTOS—Prospects for continuation of the current large turnout of cars and trucks—116,023 units in the week ended Mar. 20—depend largely upon the duration of the coal mining disruption, and on its effect on the steel industry. Schedules are being held at planned levels currently in the hopes the dispute will soon be settled, but curtailments will be drastic next month if mines continue closed.

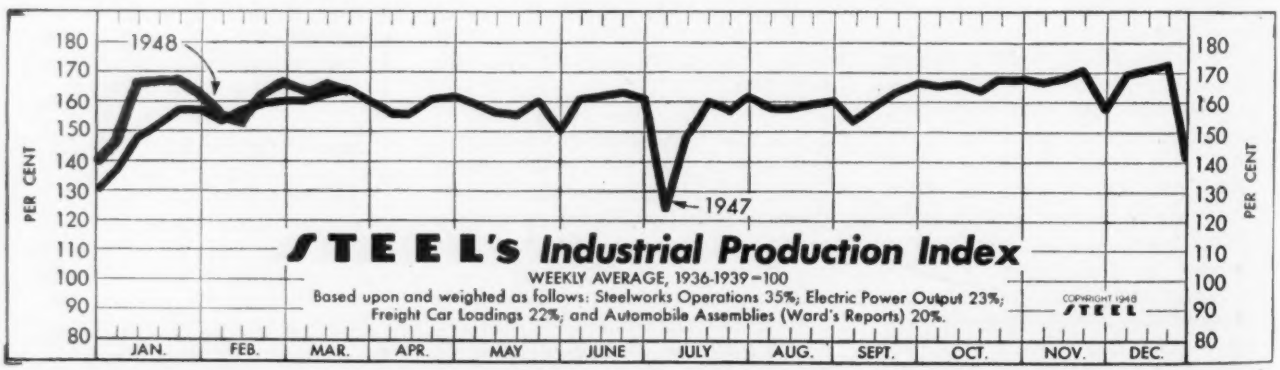
COAL—National Coal Association estimated soft coal production in the week ended Mar. 20 at between 2 and 2.5 million tons, compared with 13.3 million in the previous week. Production before the walkout, furthermore, had been about 6.5 per cent less than in the comparable period of 1947, with 129,550,000 tons mined from Jan. 1 through Mar. 13, against 138,525,000 tons in the corresponding 1947 period.

PRICES—Declines in most farm product prices and in some food quotations in the week ended Mar. 13 eased the Bureau of Labor Statistics' wholesale price index down 0.4 per cent to 159.8 per cent of the 1926 average. Raw material prices were off 0.9 per cent to 174.9 per cent, with manufactured products' prices remaining unchanged.

CONSTRUCTION—An estimated 47,000 permanent nonfarm dwellings were begun in February, according to the Bureau of Labor Statistics, to bring the total of housing starts in the four-month period—November, December, January and February—to 40 per cent above the number begun in the corresponding 1946-1947 period. F. W. Dodge Corp. reports contracts awarded in 37 eastern states in January and February totaled 28 per cent more in dollar volume than in the like 1947 period, with $1,297 million of contracts awarded in the latest period.

RETAILING—Sales by independent retailers were 5 per cent greater in February, 1948, than in February, 1947, the Bureau of the Census reports. Volume in the latest month was 9 per cent below January.

FAILURES — Total number of business failures reached the highest level in five years in February, Dun & Bradstreet Inc. states, with 417 closures recorded. This was four times as many as in the like 1947 month.



Index (chart above): Week ended Mar. 20 (preliminary) 166 Previous Week 167 Month Ago 166 Year Ago 164

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	96.0	95.5	93.5	96.5
Electric Power Distributed (million kilowatt hours)	5,145	5,285	5,254	4,759
Bituminous Coal Production (daily av.—1000 tons)	2,217	2,171	1,872	2,233
Petroleum Production (daily av.—1000 bbl.)	5,240	5,256	5,342	4,862
Construction Volume (ENR—Unit $1,000,000)	$90.3	$96.0	$88.6	$109.1
Automobile and Truck Output (Ward's—number units)	116,023	114,689	110,536	108,472

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

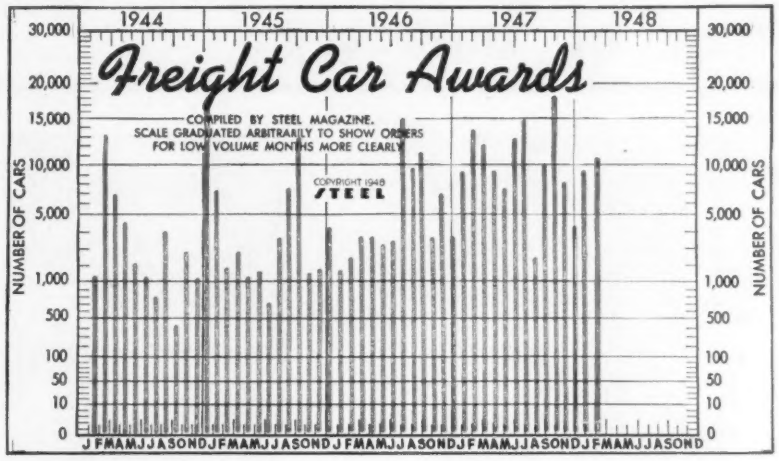
TRADE				
Freight Carloadings (unit—1000 cars)	760†	797	805	844
Business Failures (Dun & Bradstreet, number)	106	102	107	47
Money in Circulation (in millions of dollars)‡	$27,920	$28,006	$28,053	$28,330
Department Store Sales (change from like wk. a yr. ago)‡	+4%	+5%	−3%	+10%

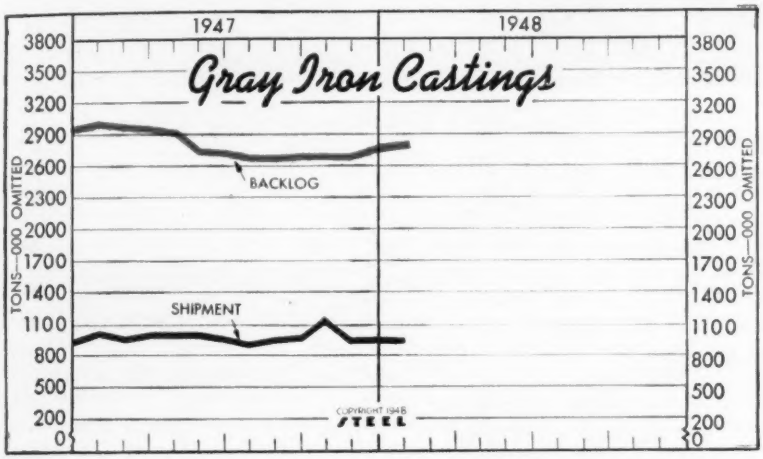
† Preliminary. ‡ Federal Reserve Board.

Freight Car Awards

	*1948	*1947	*1946	1945	1944
Jan.	9,213	9,172	1,481	7,200	1,020
Feb.	10,698	13,727	2,328	1,750	13,240
Mar.	....	12,049	3,512	2,500	6,510
Apr.	....	9,296	3,564	1,120	4,519
May	....	7,389	2,900	1,526	1,952
June	....	12,784	3,335	670	1,150
July	....	14,840	14,836	3,500	795
Aug.	....	2,372	9,527	7,240	3,900
Sept.	....	9,917	11,102	12,840	400
Oct.	....	17,737	3,407	1,320	2,425
Nov.	....	8,169	6,690	1,650	1,065
Dec.	....	4,218	3,441	4,116	16,245
Total	....	†121,707	66,723	45,432	53,221

* American Railway Car Institute.
† Preliminary.


1944
1945
1946
1947
1948
Freight Car Awards
COMPILED BY STEEL MAGAZINE.
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS
FOR LOW VOLUME MONTHS MORE CLEARLY
COPYRIGHT 1948
STEEL
NUMBER OF CARS
30,000
20,000
15,000
10,000
5,000
1,000
500
100
50
10
0
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D



Gray Iron Castings

(U. S. Bureau of Census)

Tons—000 omitted

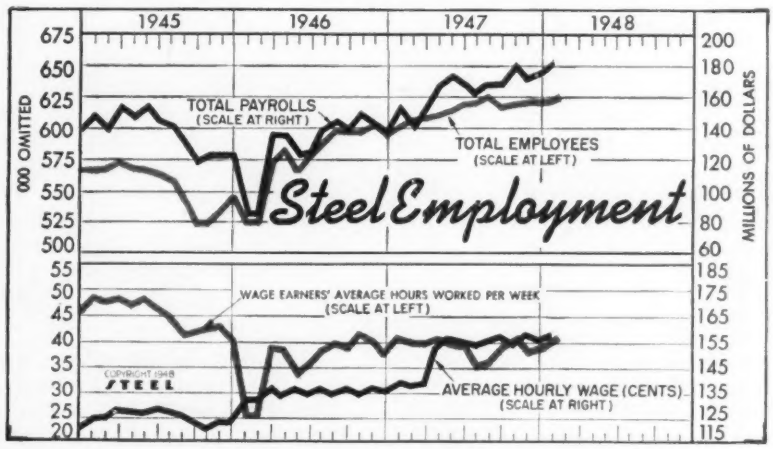
	Shipments		Backlogs*	
	1948	1947	1948	1947
Jan.	1,064	1,078	2,803	3,021
Feb.	....	1,010	....	2,987
Mar.	....	1,090	....	2,979
Apr.	....	1,097	....	2,908
May	....	1,097	....	2,783
June	....	1,038	....	2,711
July	....	913	....	2,657
Aug.	....	952	....	2,631
Sept.	....	1,025	....	2,680
Oct.	....	1,154	....	2,669
Nov.	....	1,020	....	2,687
Dec.	....	1,066	....	2,782
Total	....	12,541		

* Unfilled orders for sale to the trade.

Steel Employment

	Employees† (000)		Total Payrolls (millions)		Hourly Wages† (cents)	
	1948	1947	1948	1947	1948	1947
Jan.	622	601	$180.2	$155.8	157.3	138.1
Feb.	...	607	....	139.5	....	137.0
Mar.	...	609	....	150.6	....	137.9
April	...	611	....	168.3	....	153.3
May	...	615	....	175.8	....	155.6
June	...	623	....	167.6	....	154.7
July	...	623	....	163.2	....	153.9
Aug.	...	625	....	169.1	....	155.6
Sept.	...	618	....	168.9	....	157.1
Oct.	...	620	....	180.1	....	154.6
Nov.	...	624	....	171.0	....	158.7
Dec.	...	621	....	175.3	....	156.5

† Monthly average.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$15,219	$11,724	$12,768	$13,914
Federal Gross Debt (billions)	$253.5	$254.1	$254.8	$258.9
Bond Volume, NYSE (millions)	$17.5	$16.0	$16.5	$16.7
Stocks Sales, NYSE (thousands)	5,875	3,987	3,770	3,739
Loans and Investments (billions)†	$64.1	$63.5	$64.4	$63.9
United States Gov't. Obligations Held (millions)†	$36,193	$35,845	$36,791	$40,138

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$81.14	$81.14	$81.14	$69.82
All Commodities†	159.8	160.4	159.7	148.3
Industrial Raw Materials†	174.9	176.5	173.4	164.1
Manufactured Products†	154.3	154.3	154.5	142.1

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

DAVID D. WOOD

J. P. VEDERKO

D. H. MERRY

David D. Wood, sales engineer on the staff of the Superdraulic Corp., Dearborn, Mich., since 1946, has been promoted to general manager. Following graduation from the University of Michigan School of Engineering in 1939, Mr. Wood was associated with his uncle, **Gar Wood,** in the field engineering service of Gar Wood Industries. Later he became associated with Benjamin Foster Construction Co., Philadelphia. He joined Superdraulic staff following his release from naval service during the war.

—o—

James E. McLean has been elected vice president of Flannery Bolt Co., Bridgeville, Pa. **R. N. Scott** was appointed sales manager, and **William C. Masters,** manager of railroad sales. Mr. McLean is also vice president of Fort Pitt Mfg. Co., Pittsburgh.

—o—

H. F. Groendyk has been appointed director of product sales, Manhattan Rubber Division, Raybestos-Manhattan Inc., Passaic, N. J. He formerly was manager of the division's automotive, agricultural and aviation department. He has been connected with the company 35 years. **R. F. Teeling** has been appointed manager of the local sales branch of the division, formerly known as "New Jersey Sales," and which will function now as "North Jersey Branch." Associated with the company 36 years, Mr. Teeling was assistant manager of this branch.

—o—

James M. Barker has been elected to the board of directors, Allis-Chalmers Mfg. Co., Milwaukee. He succeeds **Alfred J. Kieckhefer,** resigned. **W. A. Roberts** and **W. C. Johnson,** executive vice presidents of the company, have been elected to the executive committee board, to replace Mr. Kieckhefer and the late **Herman W. Falk. John R. Queen,** for the last two years Texrope sales representative in the New York district office, has been named dealer supervisor at New York for the company's Empire region. **James Wilson** has retired as manager of the field engineering section of the steam turbine department after 43 years of service.

—o—

J. P. Vederko has been promoted to general superintendent of the Cross Co., Detroit manufacturer of special machine tools. He joined Cross Co. in 1946 as liaison engineer after serving for over seven years as superintendent of the Machinery Division of Ex-Cell-O Corp., Detroit. He had previously been with Ford Motor Co., Dearborn, Mich.

—o—

Joseph P. Kleinkort has been appointed general sales manager of the Ramapo Ajax Division of the American Brake Shoe Co., New York. Formerly eastern district sales manager, Mr. Kleinkort has served in various sales positions since joining the company in 1923. In his new position he will be located in the company's general offices in Chicago.

—o—

William B. Todd has been elected executive vice president and a director of Continental Foundry & Machine Co., with headquarters in Pittsburgh. He left Jones & Laughlin Steel Corp. in 1937, where he had been vice president-sales, to join the Steel Export Association of America, with headquarters in London. He returned to this country at the beginning of the war, remaining with the association in New York until 1943, when he became foreign representative for the Steel Division, WPB, at London. Two years later he returned to Washington, serving in the Steel Division of WPB until that agency was dissolved. He then joined Aetna-Standard Engineering Co. as assistant to the president, which he now resigns to assume his new position.

—o—

D. H. Merry, formerly resident engineer, has been appointed director of quality control engineering at the Detroit Engine Division, Kaiser-Frazer Corp., Willow Run, Mich. Formerly with Cadillac and Packard, Mr. Merry joined Kaiser-Frazer at Willow Run in January, 1946, and participated in the development and adaptation of the six-cylinder Continental engine for use in Kaiser and Frazer automobiles.

—o—

John E. Barbier has been appointed sales manager of Murchey Machine & Tool Co., an independent subsidiary of Sheffield Corp., Dayton, O. He has also been appointed in charge of tap sales for the Sheffield Corp. **Frank A. Henry Jr.** has been named field sales manager for Murchey products, and **Fred L. Graham,** field sales manager for Sheffield taps.

—o—

John S. Seltzer has joined Jack & Heintz Precision Industries Inc., Cleveland, as manager of customer service and stock control. Mr. Seltzer entered the purchasing department of Westinghouse Electric Corp. in 1921. He had been connected with the Lighting Division in Cleveland for Westinghouse during eight of his 24 years' association with that corpora-

for corrosion-resistance,
strength, appearance use **HARPER**

STAINLESS STEEL FASTENINGS

Our large stocks are your assurance . . .

that your production will roll without interruption . . . that your products will bear the stamp of quality in the bolts, nuts, screws and other fastenings which they contain.

EVERLASTING FASTENINGS by HARPER are strong, durable, non-rusting, non-corrosive . . . With large stocks of over 5,000 types and sizes, constantly maintained, and readily available to you, you will profit by ordering from HARPER—your logical source of supply.

H. M. HARPER COMPANY
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Branch Offices:
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Representatives in principal cities

HARPER
Chicago

Everlasting Fastenings
IN
BRASS • BRONZES • MONEL METAL • STAINLESS STEELS

tion. For the past six months he has served as a manufacturers' agent in Michigan.

—o—

Robert W. Walker has been appointed supervisor of passenger traffic in the general traffic department of B. F. Goodrich Co., Akron. He succeeds **Charles V. Dunn,** transferred to the southeastern division of the Replacement Tire Sales Division.

—o—

Iron & Steel Products Inc., Chicago, announces appointment of **Frank M. Sweeney** as sales representative in the Baltimore district.

—o—

A. F. Blackwood, for the past 12 years metallurgical and sales engineer for A. F. Holden Co., New Haven, Conn., has resigned this position and has formed a partnership with **J. W. Frazier,** who was formerly metallurgical engineer for Jack & Heintz Precision Industries Inc., Cleveland. Mr. Blackwood and Mr. Frazier will serve as metallurgical sales engineers and consultants for Crown Chemical Corp., John Ek Industries Inc., and Upton Electric Furnace Division of Commerce Pattern Foundry & Machine Co. in Ohio, West Virginia, Kentucky and western Pennsylvania. They will maintain offices in Cleveland.

—o—

Donald W. Fleser, assistant resident manager of plant No. 1, Fisher Body Division, General Motors Corp., has been named resident manager of the Atlanta plant, succeeding **L. P. Cramer.** He will be succeeded at plant No. 1, Flint, Mich., by **George Cameron,** assistant resident manager of the Norwood, O., plant.

—o—

William G. Brady Jr., chairman, National City Bank of New York, has been elected a director of Anaconda Copper Mining Co., New York, to fill a vacancy created by the death of **Gordon S. Rentschler.**

—o—

M. M. Yarrington has been named general manager, and **Fred C. Wittig,** assistant general manager, of Aeroil Products Co. Inc., West New York, N. J. Both of these men have been with Aeroil for some years.

—o—

George Morlock, general foreman of the by-products plant at Fontana, Calif., Kaiser Co., has been promoted to superintendent of the company's coke plant at Sunnyside, Utah.

—o—

James R. Butler and **Frederick J. Blume** have been appointed western and eastern managers of sales promotion, respectively, of Rheem Mfg. Co., San Francisco. Mr. Butler will have headquarters in San Francisco, and Mr. Blume in New York.

—o—

E. P. Toal, formerly with General Electric Co., has been named New England-New York district manager of Hotpoint Inc., a subsidiary of General Electric.

—o—

R. Lee Hundley has been appointed district manager in Wisconsin for Revere Copper & Brass Inc., New York. He will have headquarters in Milwaukee.

—o—

George D. Spohn has been elected to the board of directors of Cutler-Hammer Inc., Milwaukee, to succeed the late **Louis A. Lecher.**

—o—

A. E. R. Peterka has been named assistant general sales manager and director of advertising, Lamson & Sessions Co., Cleveland. **John E. Sorrell** succeeds Mr. Peterka as advertising manager.

—o—

Otto Krauss has been appointed chief engineer of Gerity-Michigan Corp., Chicago. He has been connected with the Johnson Motors Division, Outboard Marine & Mfg. Co., Waukegan, Ill., where he had been die cast engineer. In his new position he will supervise all technical phases of die casting at the company's Detroit plant.

—o—

Paul T. Skove has been appointed to the board of Perfection Stove Co., Cleveland. He is assistant secretary and purchasing agent of the company. **D. S. Smith,** vice president and treasurer, has been appointed executive vice president and treasurer; **A. J. Tener,** secretary and assistant treasurer, appointed vice president, secretary and assistant treasurer; **C. A. Blackburn,** works manager, appointed vice president and director of manufacturing; **C. H. Foulds,** general sales manager, appointed vice president and director for sales; **Marc Resek,** chief engineer, appointed vice president and director of engineering.

—o—

Richard L. Carroll has been appointed to handle sales and service of Non-Fluid Oil products in the upper New York state area for New Jersey Lubricant Co.

—o—

Two sales executives appointed for the central district office of the Westinghouse Electric Corp., Pittsburgh, are: **Charles H. Weaver,** named industrial manager, and **Quincy M. Crater,** transportation manager, each responsible for central district sales activities in his respective field. **L. H. Gillette** has been appointed manager, heating section sales, Transportation & Generator Division, and will have headquarters in Meadville, Pa.

—o—

Edwin J. Lewis has been appointed sales representative for the northern Ohio territory by Keystone Carbon Co., St. Marys, Pa., manufacturer of molded carbon and powder metal products. He formerly had been sales engineer for Ohio Ball Bearing Co. **Gerald G. Fellows** has been appointed New England representative by the company, with headquarters at Hartford, Conn. He formerly had been with Electric Appliance Corp.

—o—

Robert W. Greene has been named tractor plant superintendent for Harry Ferguson Inc., Detroit. He will assist in establishing and directing production for the new Ferguson tractor to be built at the company's new tractor plant. He joins Ferguson after 25 years with the Ford Motor Co. in a number of key production jobs.

—o—

Harold H. Mueller has joined the foundry service staff of Meehanite Metal Corp., New Rochelle, N. Y. He was formerly connected with the Minster Machine Co. and the Cincinnati Milling Machine Co. Mr. Mueller will operate from the Cleveland office of the corporation.

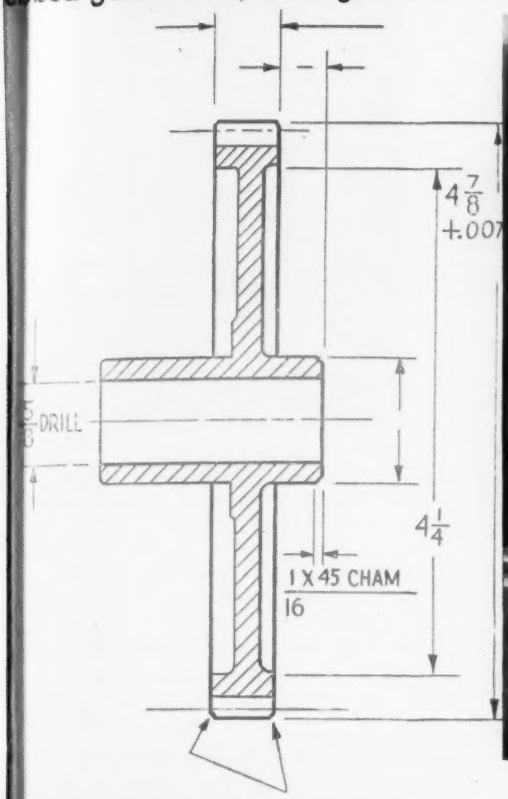
—o—

Willard K. Fohl has been named manager of service for Lukens Steel Co. and its divisions, By-Products Steel Co. and Lukenweld, Coatesville, Pa. He has been associated with Lukens Steel Co. since 1937, serving in the research and open hearth departments until 1939, when he was named assistant research metallurgist. In 1946, a year after he rejoined the company following service with

WILLARD K. FOHL

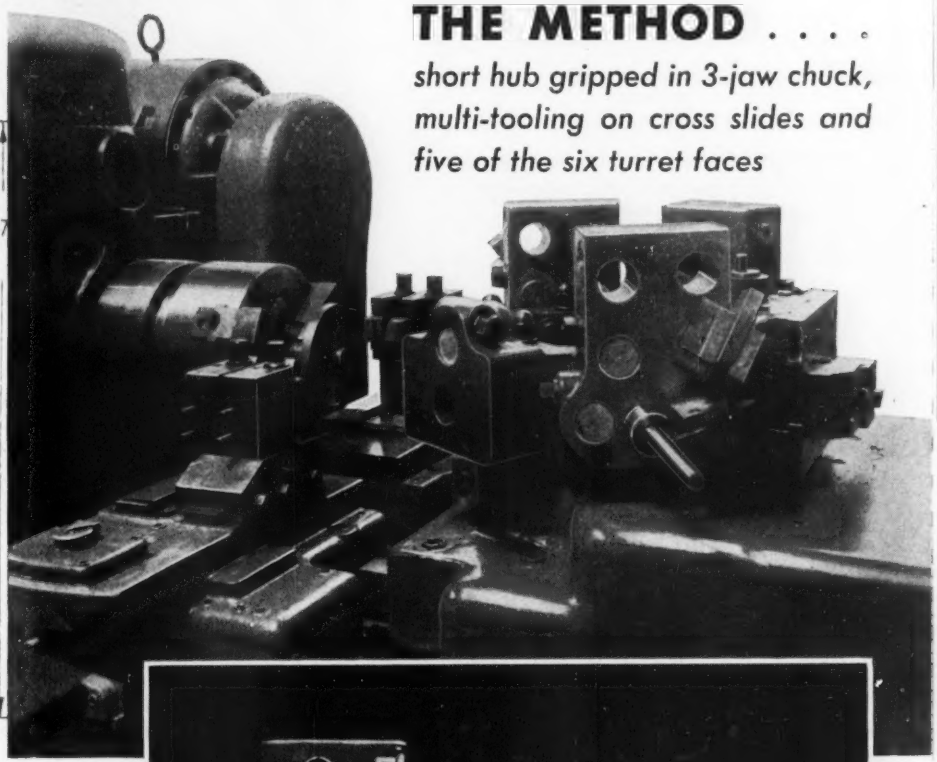
HE PART . . . .

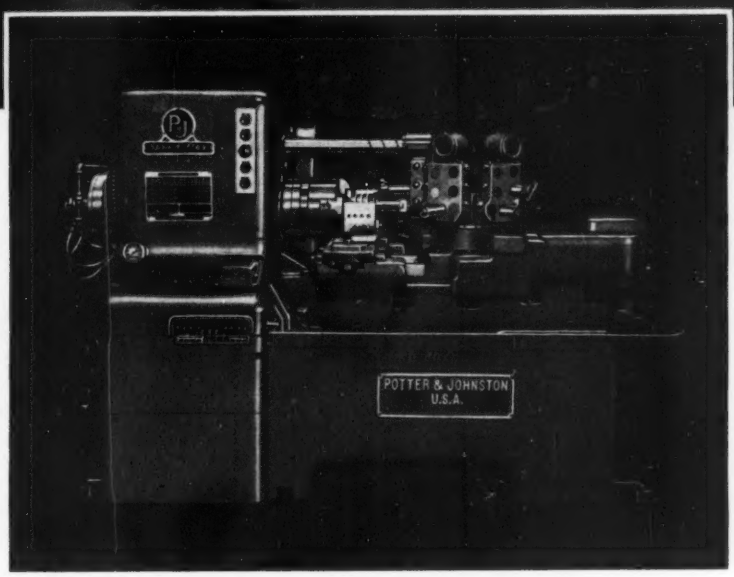
ebbed gear blank, close-grained cast iron



THE METHOD . . . .

short hub gripped in 3-jaw chuck, multi-tooling on cross slides and five of the six turret faces





THE MACHINE . . . .

3-U SPEED-FLEX

ooled by P & J production experts to tilize automatic functions so that one perator can handle three machines without physical or mental strain—thus cutting nit costs "to the bone"

Here is one of many prime examples of ability of his new Potter & Johnston Automatic Turret Lathe to "produce more and better things for more people at rices which more people can afford to pay." . .

Through ingenuity and long experience of P & J achine designers, plus production "know-how" of & J tool engineers, much of the mental responsibility nd most of the physical effort involved in multi-operational repetitive machining of this 4⅞" diameter part (and innumerable other parts up to 6" in diameter), has been transferred from man to machine—from one man to three machines in this case.

Give us a chance to study your high cost parts involving drilling, boring, reaming, turning, facing, forming, etc. We will prove to you how 3-U SPEED-FLEX methods will bring those costs way down.

Total machining time	2 min. 19 sec.
Allowance for chucking	15 "
Average time per piece	2 " 34 "
Pieces per 51 min. hour per machine	22

And—with one operator easily handling three machines, 66 pieces per 51 min. hour!

POTTER & JOHNSTON MACHINE COMPANY
Pawtucket, Rhode Island

the Navy, he was named manager of railroad sales. In conjunction with his duties as manager of service, Mr. Fohl will continue with his duties as manager, railroad sales.

—o—

Charles H. Reymer, sales engineer with Oliver Iron & Steel Corp., Pittsburgh, was honored at a 75th birthday celebration at the Ft. Pitt Hotel. He has been associated with the organization since 1907.

—o—

William P. Good, former welding technician at Mid-States Equipment Corp., Chicago, has been appointed head of the department of applied welding engineering, and **Virgil Carlson,** recently returned from government service, is the new director of the electrical engineering department.

—o—

George Bennett has joined the Harold F. Howard Co., management consultant, Detroit, as consulting engineer. He has been connected with Chevrolet Flint Division of General Motors Corp. as tool supervisor, Fruehauf Trailer Co. as chief tool engineer, and with M & M Ltd. of Newark, N. J., as plant development engineer.

—o—

William H. Buch has been appointed assistant personnel director of SKF Industries Inc., Philadelphia. He formerly was labor relations manager of the Alloy, W. Va., plant of Union Carbide & Chemical Corp., assistant personnel director of General Cable Corp., and industrial relations director of Colt's Mfg. Co.

—o—

Garrett Kingston has been elected chairman of the Buffalo-Niagara Chapter of American Society of Tool Engineering. He is New York state factory representative for Chicago Latrobe Drill Co., with offices in Buffalo.

—o—

Edward J. Duffy has been named manager of the Ironton Blast Furnace Division at Provo, Utah, for Kaiser-Frazer Corp. He has been transferred from the Fontana, Calif., plant of Kaiser Co. Inc., where he served as superintendent of the Iron Production Division, and has been with the Kaiser organization since 1942. Previous experience was with Carnegie-Illinois Steel Corp., Duquesne, Pa., Works.

—o—

After 41 years of service with American Steel & Wire Co., U. S. Steel Corp. subsidiary at Cleveland, **William H. Dodge** has retired as Chicago district traffic manager of that subsidiary. He has been succeeded by **Edward H. Finneran,** since 1944 general supervisor in the traffic department at Worcester, Mass., and associated with the company since 1916.

W. B. COULLIE

Retired as vice president and a director of Harbison-Walker Refractories Co., Pittsburgh. Noted in STEEL, Mar. 22 issue, p. 61

E. H. PHILLIPS

Appointed general sales manager, Pittsburgh Gear Co., Pittsburgh. Noted in STEEL, Mar. 22 issue, p. 56

—o—

W. E. Quillian has been appointed chief estimator and purchasing agent of Salem Engineering Co.'s southwest branch at Ft. Worth, Tex. Until his recent appointment Mr. Quillian served as chief estimator in the company's main office, Salem, O.

—o—

South Chester Tube Co., Chester, Pa., announces the following appointments: **Edward J. McCann,** formerly general works manager, appointed vice president of operations, **Raymond F. Bradshaw,** formerly treasurer, appointed secretary and treasurer, succeeding **John W. Lawton,** who retired as vice president and secretary.

—o—

Dr. Haldon A. Leedy, chairman of physics research at Armour Research Foundation of Illinois Institute of Technology, has been named acting director of the foundation. He succeeds **Dr. Jesse E. Hobson,** who resigned recently to accept the directorship of the Stanford Research Institute.

—o—

John C. Irwin, an attorney for United States Steel Corp. of Delaware, has been named secretary and general attorney for Oil Well Supply Co., a subsidiary company. He succeeds **Frank L. Wiegand Jr.,** who resigned to assume a similar position with National Tube Co., another corporation subsidiary.

—o—

T. R. Allen Sr. has been elected president of Continental Iron & Steel Co., New York scrap brokerage concern, succeeding **David Strauss,** who has been named chairman. Mr. Allen became associated with the company in 1919 and was appointed secretary in 1924 and treasurer in 1938, the position he held until his latest appointment. Mr. Allen was ordained a Baptist minister in 1944, and in addition to his business activity, is serving as pastor at the Jacksonville Chapel, Towaco, N. J.

—o—

Grier D. Patterson, member of the law firm of Winston, Strawn & Shaw, Chicago, has been elected secretary of Foote Bros. Gear & Machine Corp., Chicago.

—o—

Swan-Finch Oil Corp., New York, has appointed **Nelson V. Joyce,** vice president in charge of purchasing, and **John M. Parker Jr.,** sales manager of the Tractor Division.

—o—

William H. Schuster has been appointed welding supervisor for American Car & Foundry Co., New York. Prior to coming to ACF he was with Foster Wheeler Corp., New York, as welding engineer.

—o—

Otto C. Linhart and **Gordon S. Douglas** have joined the Chicago Vitreous Enamel Product Co.'s research laboratories staff, Chemical Division.

—o—

Rodney B. Campbell, hydraulic design engineer, has joined the Lynn Co., Burbank, Calif., as chief hydraulic engineer. During the war Mr. Campbell was chief engineer of Aeron Corp., and has been engaged in hydraulic research since the end of the war.

—o—

Kaiser Co. Inc., Iron & Steel Division, Fontana, Calif., announces

ARTHUR S. ROBERTS
Appointed secretary and counsel of SKF Industries Inc., Philadelphia. Noted in STEEL, Mar. 15 issue, p. 84

STANLEY M. COOPER
Named president, Fafnir Bearing Co., New Britain, Conn. Noted in STEEL, Mar. 22 issue, p. 61

MAURICE STANLEY
Elected chairman of the board, Fafnir Bearing Co., New Britain, Conn. Noted in STEEL, Mar. 22 issue, p. 60

that **T. A. Kay,** formerly assistant plant engineer, has been appointed plant engineer of its Fontana steel plant. He succeeds **W. A. Vogt,** transferred to Kaiser Engineers Inc., Oakland, Calif.

—o—

A. O. Anderson has been appointed senior field engineer of the western division of Rack Engineering Co., Pittsburgh. He formerly was production control manager of Ditto Inc., Chicago, and during the war was affiliated with Douglas Aircraft Co. and Lockheed Aircraft Corp., in a production capacity.

—o—

Robert E. Mozena has been named general manager of Steel Framing & Building Corp., Los Angeles, California distributor of commercial Quonset buildings and Stran-Steel framing, products of Great Lakes Steel Corp., Detroit. Other executives appointed include **R. C. Wainwright,** sales manager, and **J. P. Gunn,** chief engineer.

—o—

A. I. Pruett has been appointed general manager of Thresher Paint & Varnish Co., Dayton, O., an affiliate of Pittsburgh Plate Glass Co. He succeeds **Charles L. Sullivan Jr.,** who died recently after more than 23 years' service as president and general manager of Thresher Paint & Varnish Co.

—o—

Julius W. Marx has been appointed chief engineer at Newcomb-Detroit Co., Detroit. He has been connected with the Fisher Body Division of General Motors Corp., and more recently as plant engineer at the Truck and Coach Division of General Motors.

—o—

George Reed, a metallurgical engineer with Timken Roller Bearing Co., Canton, O., has been appointed sales engineer of the company's Steel & Tube Division, with headquarters in Houston, Tex.

—o—

Seattle-Boeing Airplane Co., Seattle, announces appointment of **W. W. Rutledge** as first assistant to the vice president of manufacturing, Seattle Division. Mr. Rutledge was formerly manager of experimental production, and has been succeeded in that capacity by **Lee Samples. Roger Holman,** assistant to the vice president-manufacturing, has assumed direction of plant engineering, the maintenance department of Boeing plant No. 2, and of the transportation department.

—o—

J. H. Smith, formerly vice president in charge of marketing, General Electric X-Ray Corp., subsidiary of General Electric Co., has been appointed executive vice president and a director.

—o—

Roy W. Johnson has been appointed general manager of the affiliated manufacturing companies department of General Electric Co., Schenectady, N. Y. This post was formerly held by **L. R. Boulware,** vice president.

—o—

Link-Belt Co., Atlanta plant, announces establishment of a district sales office in Jacksonville, Fla. **Robert L. Lowder,** formerly district sales engineer at the plant in Atlanta, has been appointed district sales manager in charge of the new office. He has been a member of the Atlanta office since 1927.

—o—

Alfred B. Connable Jr. has been elected chairman of Monroe Calculating Machine Co., Orange, N. J.

OBITUARIES . . .

Philip F. Beal, 79, founder of the well-drilling and pumping machine company of P. F. Beal & Sons, Brewster, N. Y., died Mar. 17.

—o—

Philip N. Wenz, 58, secretary, Foster Wheeler Corp., engineering and manufacturing concern in New York, died recently.

—o—

Alexander Gordon, 67, attorney and former special counsel of the Aluminum Co. of America, died Mar. 18.

—o—

James M. Cunningham, 62, director of industrial relations at the General Aniline & Film Corp. plant at Grasselli, N. J., died Mar. 18.

—o—

Henry B. Scott, 65, retired assistant treasurer of United States Steel Export Co., New York, died Mar. 15 at his home in Cranford, N. J.

—o—

Herman A. Holz, 69, founder of the National Machine Tool Co., in which he was active until his retirement in 1940, died recently at his home in Cincinnati. He was a son of a founder of the Cincinnati Milling Machine Co.

—o—

Stephen T. Van Esen, 37, retired advertising manager of Hammarlund Mfg. Co., New York, makers of electronic equipment, died Mar. 16.

—o—

George A. Altendorf, 65, vice president and manager of Giant Grip Mfg. Co., Oshkosh, Wis., died Mar. 19 at Milwaukee.

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Engineering News . . . AT A GLANCE

ANNEALS "ON THE DOUBLE"—Eighty-eight thousand electric motor rotor and stator laminations of 24 gage silicon sheet stock are annealed every 13 hours by a Chicago firm with the use of a "5 in 1" furnace supplied by Lindberg Engineering Co., Chicago. The installation anneals about 2400 pounds or 44,000 laminations during each heat—reaching annealing temperatures of 1375 to 1450° F in only 4½ hours—twice as fast as the previous method. In the operation, work is held at annealing temperature for 1 hour, partially cooled for 1 hour, then removed and air cooled while two more loaded fixtures are lowered into the furnaces' work chamber.

"DE-SKILLED" OPERATIONS— In Germany, according to observers of the Office of Technical Services, Washington, use of unskilled, impressed foreign labor influenced developmental work in the railroad field to a considerable extent, and resulted in some interesting fabrication methods. At a locomotive factory in Wuerttemberg, for example, operations normally regarded as calling for skilled workers were adapted for unskilled labor. Cylinders and valve chambers were bored by a tool head that fixed the bore diameter without frequent skilled adjustment. Templates, jigs and fixtures were used in much of the drilling and machine work to eliminate laying out, calipering and measuring.

CUTS OPERATING COSTS—Saving costs of better than 30 per cent on operating cost is derived from a method of cleaning hollow ware prior to enameling in the plant of Republic Stamping & Enameling Co., Canton, O. Method is a process of bright annealing in which the work passes through a General Electric roller-hearth furnace that produces on the work surfaces that resemble aluminum. Only three men are now required on the job against seven for the previous technique used.

"CLICKING" ATOMS—When lithium is cooled in a bath of liquid nitrogen and the latter frozen at a temperature of minus 345° F, the usual body-centered cubic crystal structure is about half converted to hexagonal structure, Dr. Charles S. Barrett of the University of Chicago, told members of American Association for Advancement of Science, recently. If it is hammered or bent while immersed in liquid air, he said, it is partly changed to another new form which is face-centered cubic arrangement of atoms. These changes make clicking sounds indicating they occur with suddenness, with each small crystal of new structure forming almost simultaneously with an abrupt shearing movement of atoms. These same changes are similar in many respects to those occurring in steel when hardened by quenching from a high temperature.

"TUNED" TO OPERATIONS—Assembly line operations on television sets in the Camden, N. J. plant of RCA Victor division of Radio Corp. of America, are performed in 2-minute cycles at 80 work stations by same number of skilled operators along six parallel belt conveyors which pace production on basis of standard-data time values. Conveyor movement is about 50 feet per hour, but the drives are equipped with mechanical variable speed units to accelerate line according to production requirements. Belt carriers bring the chassis along assembly lines 1, 3 or 5, returning them the same distance in reverse via lines 2, 4 and 6 through mechanical, soldering and crimping operations.

PLUNGE CUT PROFILING—Latest method of machining pods of rolls used in many steel mills, developed by Giddings & Lewis, makes use of tungsten carbide cutters for plunge cut boring and plunge cut profiling in removing the metal rapidly during roughing operations. Method centers around a roll-holding fixture that consists of a rear and forward roll support. Various length rolls are handled by simply moving rear support toward or away from forward support. The latter also includes a rotating mechanism which can rotate the roll at varying speeds to provide proper feed for contour milling operations. It also can be indexed and locked for plunge cut operations. (p. 72)

25-SECOND WELDING JOB—Twenty-gage steel food compartment liners, consisting of three parts, are joined in one operation in a matter of 25-1/2 seconds on the latest welding equipment employed in the plant of Seeger Refrigerator Co. This enables the St. Paul company to produce the liners at a rate of about 90 units per hour with one operator and helper tending the mash seam welder. Weld produced by the machine requires no finishing or dressing prior to application of porcelain enameling. (p. 78.)

PARAFFINICITY IN QUENCHING—Quenching efficiency increases with rise in boiling point of the compound, it was found, during interval quench tests on pure compounds representing paraffinic, naphthenic and aromatic materials. According to E. L. H. Bastian, staff engineer for Shell Oil Co., these same tests demonstrated some superiority of the paraffinic oil for high quench efficiency, although effects of addition and special compounds appears to outweigh differences attributable to paraffinicity. Principal advantage of paraffinic type oil is in respect to resistance to sludging and premature deterioration in service. (p. 79)

NO "HOT PIPES"—Steam heating system is used to maintain oil at constant temperature of 110° F in the back-up roll bearing lubricating system employed in the J & L, 70-mile-per-hour, continuous 5-stand tandem cold reduction mill in the Aliquippa works. This eliminates heating of pipes incorporated in the two 14,000-gallon tanks. (p. 86).

Profile Milling

APPLIED TO ACCURATE ROLL POD MACHINING

Unusual attachments and fixtures make standard horizontal boring, drilling and milling machine the equivalent of a highly specialized steel mill machine tool

PLUNGE cut and contour milling successfully applied to machining rolling mill roll pods represents a definite advance in simplifying this specialized and difficult class of work. The new machining method centers around the use of a specially designed roll holding fixture on a floor type Giddings & Lewis horizontal boring, drilling and milling machine equipped with a synchronized dual hydraulic tracer control attachment. Tungsten carbide cutters designed for plunge cut boring and plunge cut profiling rapidly remove metal in all roughing operations. Contour milling with a sectional slab mill then gives required accuracy and final finish to the roll pods.

In large roll shops where steel rolls are made in quantities, there is wide variation in types of rolls machined and in roll diameters and lengths. In addition, pods and splines on roll ends usually differ. Type of pod is determined largely by the mill on which the roll will be used. For example, a tin plate mill, a strip mill or a sheet mill may require single radius, double radius or splined type pod to fit the particular wabbler or driver.

To appreciate the machining problem confronting roll manufacturers, consider the typical pod shapes illustrated by templates in Fig. 1. Both single and double radius pods are shown. These are just a few of the forms that can be readily duplicated in the roll end when plunge cut and contour milling methods are used.

While it is the sincere intent of each manufacturer to produce rolls having pods machined to close limits, too many rolling mill fits have turned out to be comparatively loose, causing undue amount of play between the pod and wabbler. This condition, however, has not been allowed to exist on rolls designed for rolling gold and silver leaf, aluminum and different type foils. With introduction of better pod machining methods, such as described herein, it is reasonable to anticipate improved fits of pods and drivers alike on all rolling mill equipment. It is reasonable to assume that with such better fits roll life will be increased. Before proceeding with descriptive details about the new method, it is desirable to understand how pods have been machined.

Fly Cut Boring of Pods—Fly cut boring is the conventional method used for rough shaping roll pods by many of the country's leading producers of rolls. Analysis proves this to be a laborious and time-consuming procedure, many hours of hand grinding being required to produce the final finish. Essential steps in forming a pod by fly cut boring are shown in the operational drawing, Fig. 4.

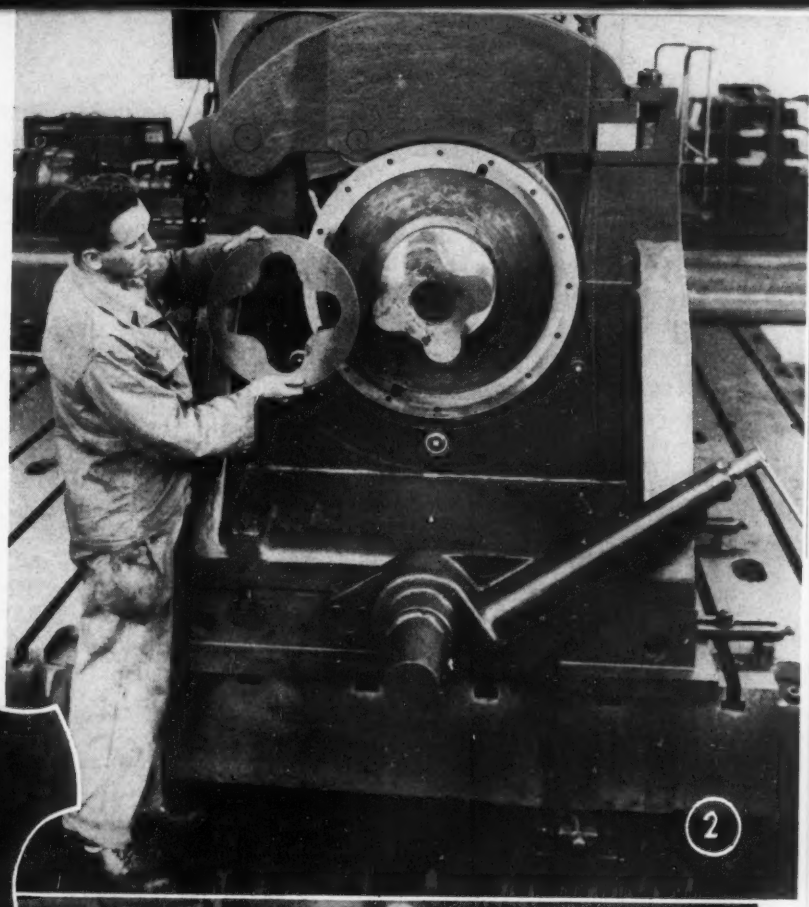
First, a sweeping cut is made to remove as much metal as possible from between roll teeth or lobes. Secondly, it is necessary either to reset the fly cutter, or to change cutters to produce the desired bottom radius. This second operation results in high points

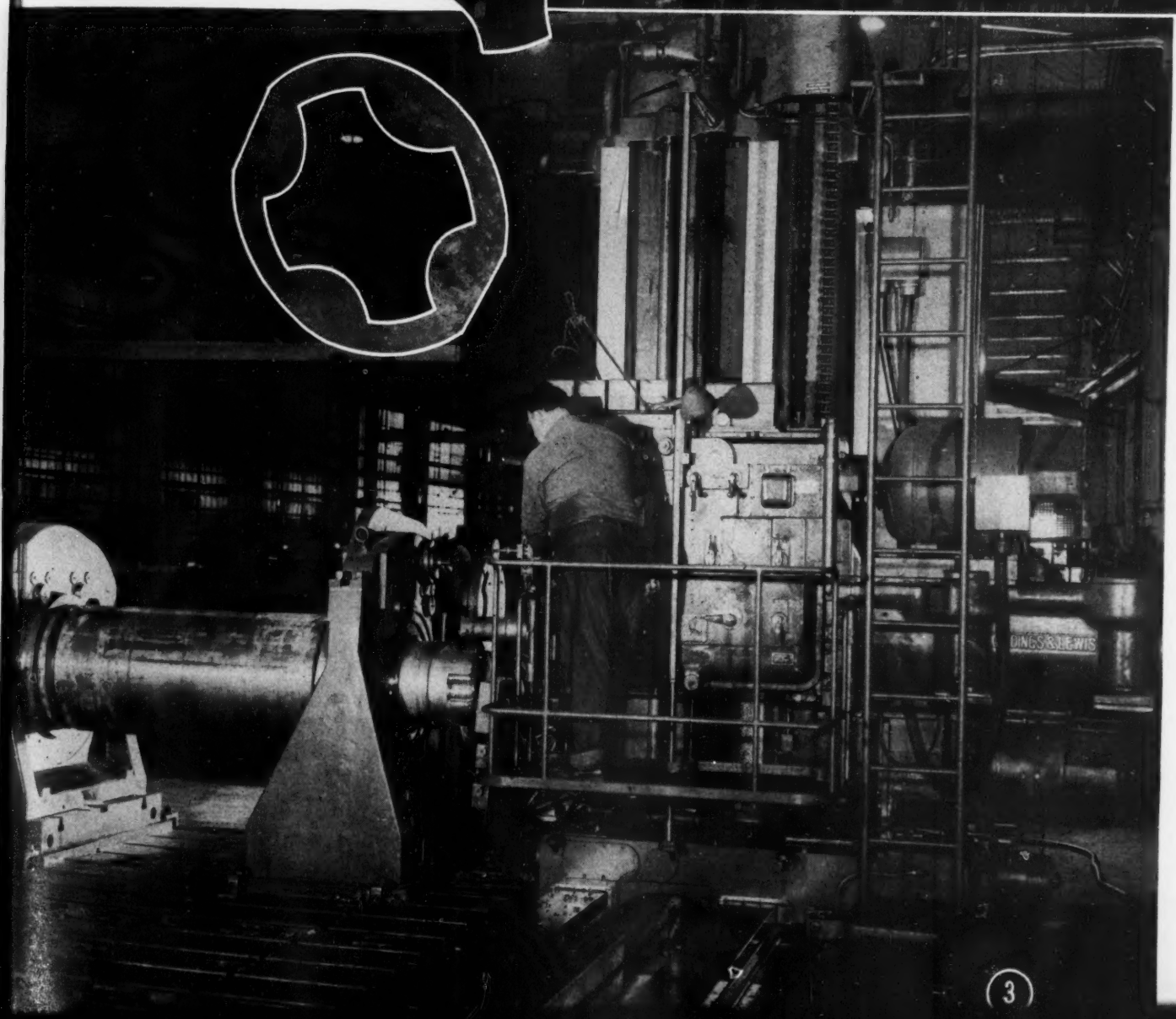
Fig. 2—This rear roll support is adjustable on its base. In addition, various size bushings can be placed in bearing ring to accommodate different size rolls

Fig. 3—Overall view of complete setup used to machine rolls on floor-type horizontal boring, drilling and milling machine

By DONALD M. LAFLIN
Giddings & Lewis Machine Tool Co.
Fond du Lac, Wis.

Fig. 1—These steel templates show variety of pod shapes and sizes possible to machine using a horizontal boring machine equipped with hydraulic tracer-control attachment





on either side of the cut. These points must be removed in the third operation by a series of shallow fly cuts. After as much metal as practical has been removed in this manner, the roll is sent to the hand grinder for finishing. High points still existing must be ground off to produce final finish. This is work completed in the fourth operation, shown in the sketch.

Overall time for machining pods varies according to skill of the boring machine operator and number of cuts required to remove the bulk of the metal. Time taken for hand grinding depends on how much remaining metal must be removed to establish a reasonable bearing fit. Alloted time for grinding ranges from 1½ to 4½ hours.

Synchronized Roll Holding Fixture—As already mentioned, the new method of machining pods by plunge cut and contour milling, as now employed successfully in the roll shop of a large steel company, centers around a roll holding fixture especially designed for this work. This machine accessory or fixture is made up of two components, a forward roll support and rear roll support. When the horizontal boring machine is set up for this work, the fixture supports merely are placed on the machine floor plate and bolted down. An illustration of this device, showing its position in relation to the machine spindle, is presented as Fig 3.

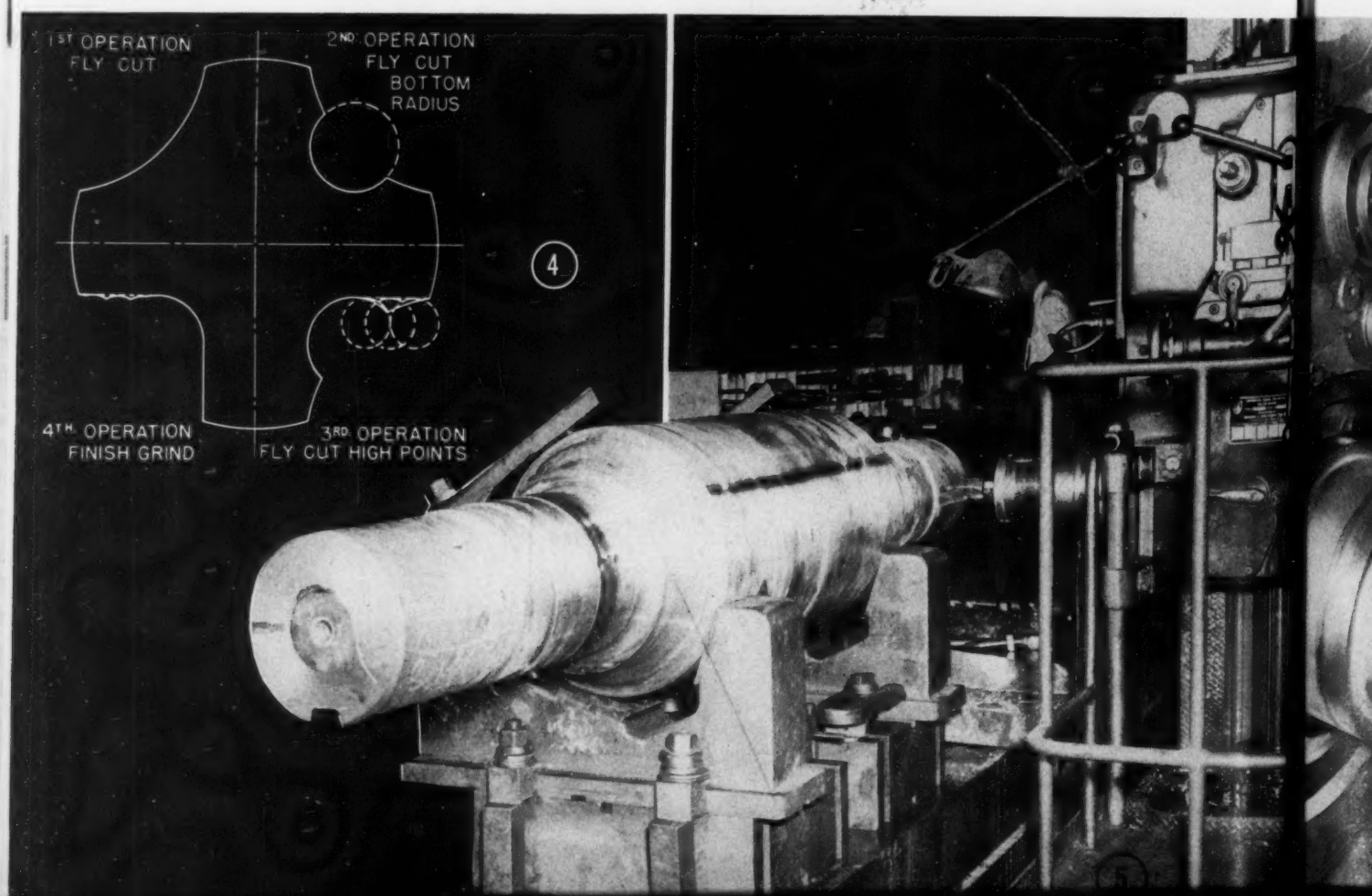
Bronze bushings are fitted over the roll ends. These in turn are locked in steel bearing rings which rotate on hardened roller type bearings. Fig. 2 shows the rear bearing support with roll end, bronze bushing and roller asembly in position. Changing of bushings in the bearing ring permits mounting of different diameter rolls in the fixture. Handling rolls of various lengths is accomplished simply by moving the rear roll support toward or away from the forward support. The rear support has a hand operated worm and gear to move it on its sub-base. This feature permits rapid final adjustment thus minimizing overall setup time.

Both supports are equipped with over-arm clamps. When open, these permit placing of roll—complete with bushing and bearing assembly—in the fixture. After roll is seated, over-arm clamps are closed and hold down bolts tightened. Thus, accurate adjustment of bearing tension to insure rigid support of the roll is readily attained.

Rotating Mechanism—Mounted on the forward support and forming an integral part of it is the roll rotating mechanism. This is operated by a hydraulic feed motor, through reduction gears. This roll rotating motor is synchronized with a similar motor attached to the machine headstock elevating screw. Both are activated automatically by a solenoid-op-

Fig. 4—Operational drawing indicates number of fly cuts necessary to remove stock in shaping roll pods

Fig. 5—This small roll is mounted at right angles to machine spindle for keyway and spline cutting. Same procedure can be followed for cutting splines on large rolls; in that case, power-operated roll holding fixture would be turned 90 degrees



erated tracer control which follows a steel template.

Incorporated in the design of the rotating mechanism is a 360-tooth spur gear mounted on the steel bearing ring. In Fig. 7 a segment of this gear can be seen immediately above the manually operated locking device behind the eyebolt.

Roll can be rotated at varying speeds to provide proper feed for contour milling operations. Also it can be indexed and locked for plunge cut boring and spline milling. The locking device, when meshed with the ring gear, provides a positive means for obtaining correct roll graduations through 360 degrees. An interlocking switch is provided as a safety factor and when the gear is locked it is impossible to apply power to rotate the roll.

In order to mill splines on the roll pod, or to cut keyways, it is necessary to reset the two roll holding fixtures by turning them 90 degrees. The roll then will lie at right angles to the machine spindle. A representative set-up of this type is illustrated in Fig. 5. This is a small steel roll, placed in open side V-blocks. In this setup it is necessary to turn the roll manually to position required for making the spline cut. A similar setup is utilized in machining splines on large rolls. In that case, however, the regular workholding fixture is employed, power feed being used to rotate the roll. Any number of splines can be milled in the pod, depending upon the indexing.

Synchronized Tracer Control Attachment — Using a dual hydraulic tracer control attachment on the horizontal boring machine, an infinitely variable combination of feeds is possible. Two hydraulic motors control these power feeds. Both are synchronized to respond to the solenoid tracer control.

One motor rotates the roll. The other raises and lowers the machine headstock. This combination of

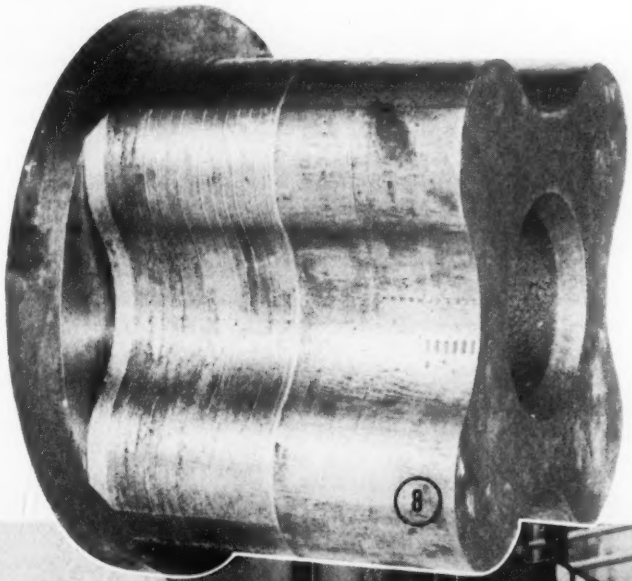
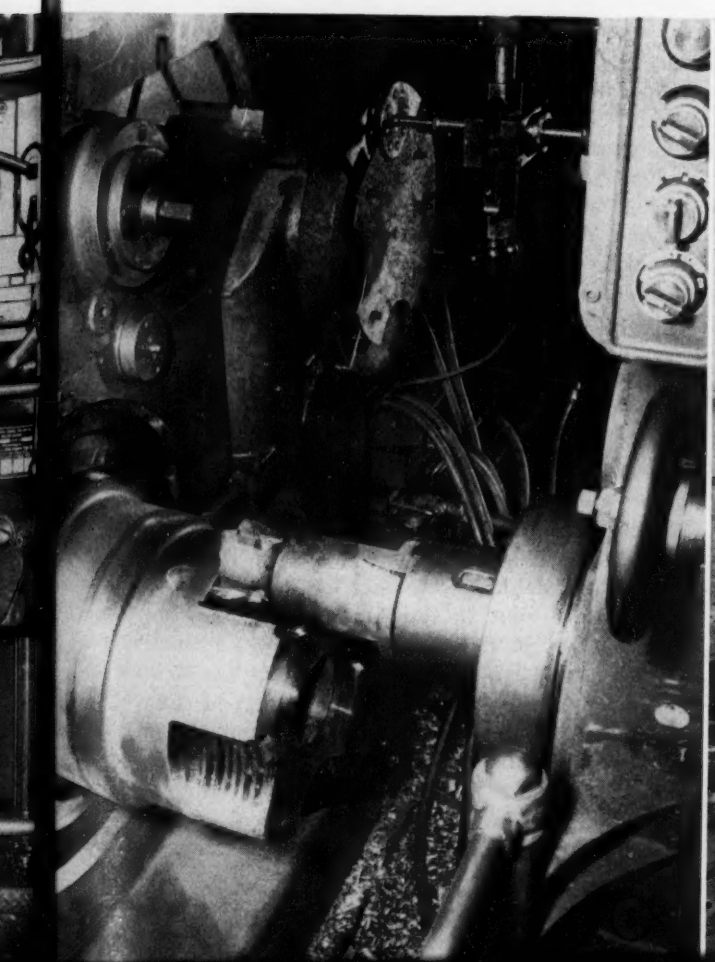
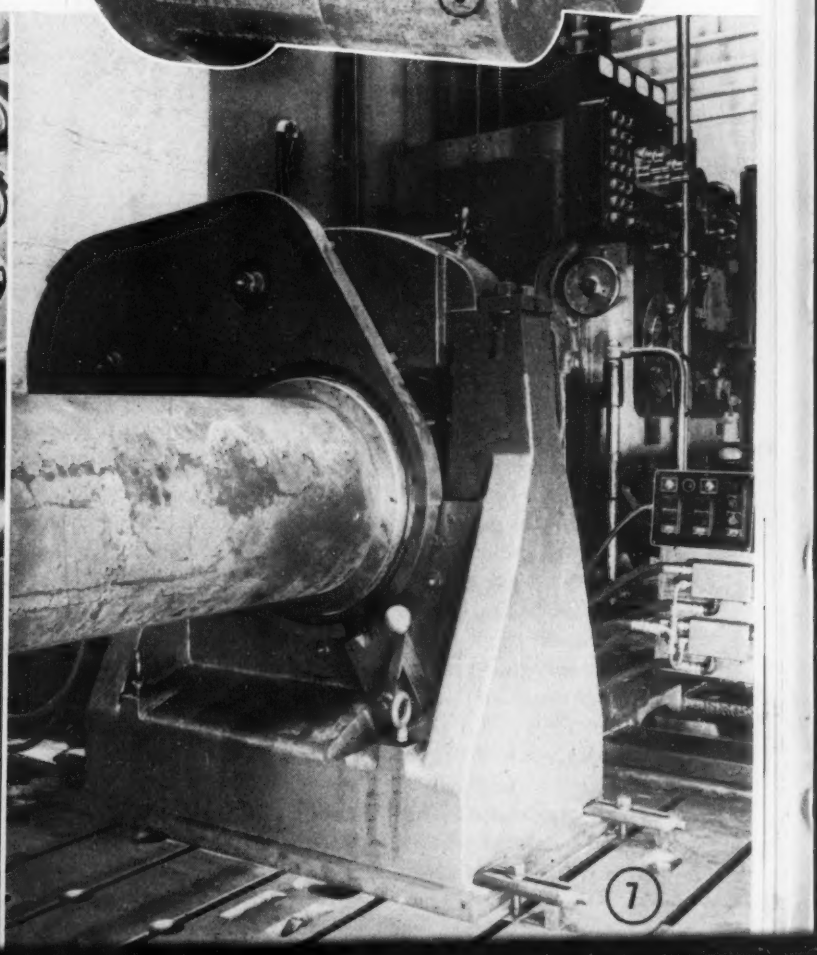


Fig. 6—Stylus follows steel template as face plate rotates at same ratio as roll

Fig. 7—An integral part of this forward roll support is hydraulically operated rotating mechanism. Manually operated locking device shown, lower right, serves as indexing stop when cutting splines

Fig. 8—Sample roll pod cut from scrap roll to show both rough and finished surfaces. Observe unusual width of cut in roughing operation





feed motions will produce any desired contour or pod shape through template control.

Steel templates are mounted on a revolving face plate which rotates at the same rate as the roll. A stylus identical in size to the cutter on the tracer arm, Fig. 6, follows this template. Its resulting rise and fall activates a solenoid which in turn controls the hydraulic motors which in their turn control the cut and speed at which the roll revolves.

Simple regulation of center distance between stylus and roll determines depth of cut. This is accomplished by adjusting a hand screw that raises and lowers the slide holding stylus and tracer arm. A single setting of this screw determines the amount of stock to be removed from the entire depth of the pod. Machine spindle adjustment is used after each revolution of the roll to vary the "bites" from ¼ in. to ⅝ in. After the cutter has traversed the entire depth of the pod, it is retracted. The hand screw is again adjusted and a second cut is made in the same manner. This process is repeated until the metal has been roughed out. Cutters then are changed for the finishing operation.

The hydraulic mechanism is in the form of an attachment which readily can be mounted on, or dismounted from, the standard machine. When this attachment is not in use, the horizontal boring machine is available for any of the numerous boring, drilling, milling, tapping, turning and other operations which can be performed on these highly versatile machine tools.

Importance of Carbide Cutters — In order to take full advantage of the modern horizontal boring machine's capabilities, carbide cutters have been especially designed by Goddard & Goddard Co. both for plunge cut milling and plunge cut boring on this roll job.

These cutters are inserted blade type boring tools. Originally they were designed to rough cut the stock from the roll end by axial boring. Cuts about ⅝ in. deep were taken throughout the length of the pod. This method of machining proved successful from the start. However, to determine the best machining procedure it was decided to try the same tools for profile milling. Depth of cut in this instance was ¼-in. in an axial direction. At the same time the roll was rotating about its axis, the cutter was fed up and down by means of the tracer control attachment. This last cutting procedure also proved satisfactory during test runs carried out at Giddings & Lewis Machine Tool Co. even though the tool was designed primarily for boring rather than for profile milling.

On the basis of similar trials at the roll shop where this machine now is in operation, plunge cut profiling is being used in preference to boring. This method necessitates feeding work to cutter at 90 degrees to axis of rotation. Milling in this manner has required slight changes in the original cutter design. The

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

MOONEY ON MOTORING: On March 18, as a "by-product" of the big Tool Show in Cleveland, I had the privilege of sitting in on an interview with James D. Mooney, president and chairman of the board, Willys-Overland Motors, Toledo. Mr. Mooney has seen a lot of the world and has gained deep insight into the economic facts-of-life since he graduated in mechanical engineering from Case in 1908. He is strongly of the opinion that all of us must revise our motoring habits in the interests of economy.

He is convinced that the days of "show off" motoring, involving oversize, overpowered cars which make prodigal use of fuel, definitely are over for the average user. We no longer can afford that kind of motoring, nor is there indication to him—as his practiced eyes gaze into the crystal ball revealing future world conditions—that we ever again will be able to afford wasteful motoring.

Mr. Mooney naturally is a firm believer in the "Jeep" as a vehicle for all around utility and common sense transportation to meet conditions which we now face. His company now builds them in eight models. In the course of his conversation, he mentioned casually that in February, 1948, 15,000 of these vehicles were turned out, and that his production goal for 1948 is 200,000 units.

It certainly does look as though common sense motoring is generating "big business"—despite the traditional "yen" of the American for big vehicles and big houses. We all know that economic changes already have ruled out the big houses. Mr. Mooney may be right about the vehicles.

MASS PRODUCED LOCOMOTIVES: Early in March I spent an afternoon in one of the great locomotive shops. It has no more in common with the locomotive shops I used to know, than the Studebaker automobile plant has with the old Studebaker wagon factory. I get around a great deal and I had prided myself on being up-to-date on what is going on in the machinery building industries.

After my visit to the American Locomotive Company's plant in Schenectady, however, I must admit that I have been in the class of Rip Van Winkle as far as locomotive situation is concerned. Are you sure, Mr. Machine Tool Builder, that you also are not a Rip Van Winkle in that respect? If so, I advise you to wake up!

What I saw in Schenectady is typical of those sudden changes which affect American industry. Here is

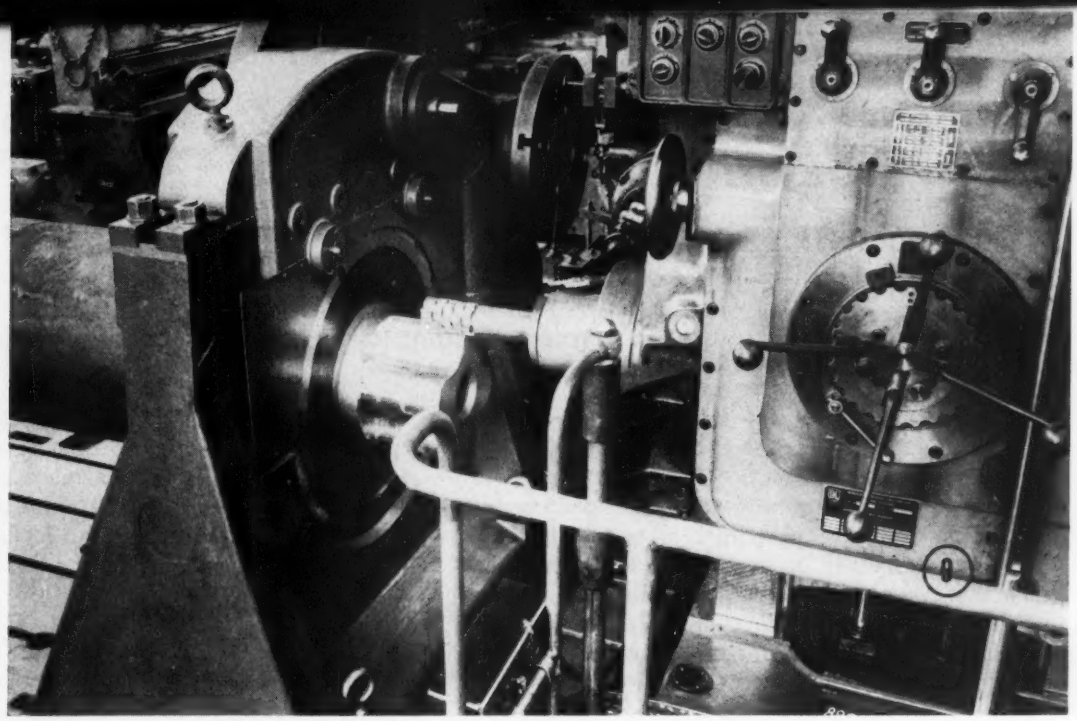


Fig. 9—This sectional slab milling cutter is used to finish pod contour to give driver fit

corner angle on the blades has been altered to obtain desired stock removal in minimum time. Depth of cut now is ⅜-inch in an axial direction. Feed is at right angles to the axis of cutter and work. Fig. 6 indicates size of bites taken by roughing cutter. Bulk of metal between lobes is removed in this fashion.

To finish the pod a special sectional slab mill and special arbor are used. This assembly, illustrated in Fig. 9, has four 1-inch sections and one 1¼-inch section. Six teeth in each section are staggered in the manner shown to produce the desired roll finish.

The job information indicated in Fig. 8 holds considerable interest because this shows the steps necessary to establish correct machining procedure. Marks on the inner surface of the pod indicate the roughing cuts taken to remove stock. (*Please turn to Page* 98)

what R. B. McColl, president of Alco, has to say about it: "The transition of the past 28 months, which is now virtually complete, has been two-fold. Before the war our principal business at Schenectady was the manufacture of steam locomotives—custom made to the individual requirements of our railroads.

"Today, after having made conversion expenditures of approximatetly $20,000,000, we find that 92 per cent of our locomotive manufacturing for domestic use is in the diesel-electric field. Alco now is building, in partnership with the General Electric Co., standard diesel-electric locomotives to fit every conceivable motive power need."

And so it was that instead of seeing the old familiar boiler work and big wheel work and all the other locomotive crafts being practiced, I saw what in effect is a beautifully equipped plant for the interchangeable manufacture of huge motor vehicles designed to run on rails instead of roads. The automotive industry has left its mark on many other industries, but in no case any more plainly than in this locomotive business.

The workmen, the materials, the nature of the shop, the methods and—above all—the machines, are different than those of the age of steam. If George Stephenson or Matthias Baldwin could step into this shop, they would recognize neither the products nor the processes as having anything to do with locomotives as they knew them. The new products and new processes open up an entirely new field for machine tools. Again I say: "Mr. Machine Tool Builder, wake up!"

PRESSES AROUND THE CLOCK: Time after time during the past 18 years I have seen well-known public relations counselors stand up before meetings of industrial associations to urge that annual reports of manufacturing companies be made understandable and even interesting. They urged this in the interest of better relations between workers and management and between the public and "big business".

I have good reasons for believing that those exhortations have struck home. Lately I have been receiving an increasing number of annual reports from which financial facts can be learned without the help of the traditional "Philadelphia lawyer", and which also give progress reports on plants and products.

John J. Feeley, advertising manager, E. W. Bliss Co., Detroit, has just sent to me one such report—one which does great credit to that builder of presses and to the good cause of plastic working of metals. This 20-page brochure contains 14 photographs covering recent plant expansions. It has 16 showing everyday products produced on Bliss presses. Under the heading "Bliss Follows You Around the Clock" it has 27 illustrations showing how pressed metal products influence our daily lives from the "early morning tub" to the late evening dinner party.

Not only do these 11 pages of pictures create an extremely favorable impression, but so also do these words from the forthright message from Marshall M. Smith, president, to the shareholders: "For the year ending December 31, 1947, net earnings amounted to $2,285,274, which is equivalent to $6.67 per share of common stock, as compared with $4.06 for 1946.

Three-Part Refrigerator Liners

JOINED IN ONE OPERATION

Complete welding cycle of each operation takes 25½ seconds

PRODUCTION of 20-gage steel food compartment liners in the plant of Seeger Refrigerator Co., St. Paul, now ranges between 90 to 180 units per hour since the installation of a specially designed welder which joins the three part liner in one operation.

Liner is composed of three part wrapper which forms the two sides and back of liner, and the top and bottom which are welded to ends of the wrapper. Formed liner wrapper is placed in traveling fixture carriage and held in place with air actuated clamps. Top and bottom of liner are then placed in position at opposite ends of wrapper and are held in position by air clamps so that they form a 3/16-inch overlapping joint with flanged ends of wrapper.

Traveling fixture carriage moves into position under hydraulic pressure and seam welding heads operate simultaneously on each end of liner. Upon completion of weld, fixture carriage automatically moves out of machine and positioning clamps release completed assembly which is then removed manually.

Complete welding cycles takes 25½ seconds which produces approximately 90 units per hour using one operator and one helper for loading and unloading. Production on machine can be raised to 180 units per hour using one operator and three helpers with addition of a shuttle-type fixture carriage and enlargement of hydraulic pumping unit. Two men are stationed at each end of machine. One crew loads fixture carriage while welding is being performed on liner assembly which is in position. The mash seam weld requires no finishing or dressing prior to application of porcelain enameling.

Welding of refrigerator liners is being done with a mash seam welder developed by Federal Machine & Welder Co., Warren, O. Machine is provided with three 300 kilovolt ampere watercooled welding transformers wound for 440 volt, 60 cycle, single phase alternating current power supply. One transformer is mounted in each of the three dual welding heads. Welding wheel spindles are internally watercooled.

Machine has its own hydraulic system complete with pumping unit and oil cooling reservoir for supplying fluid under pressure to welding head traveling cylinders and fixture carriage actuating cylinder. Vertical and lateral manual adjustment of welding heads accommodates welding of various size liners. Changing limit switch settings changes weld travel length.

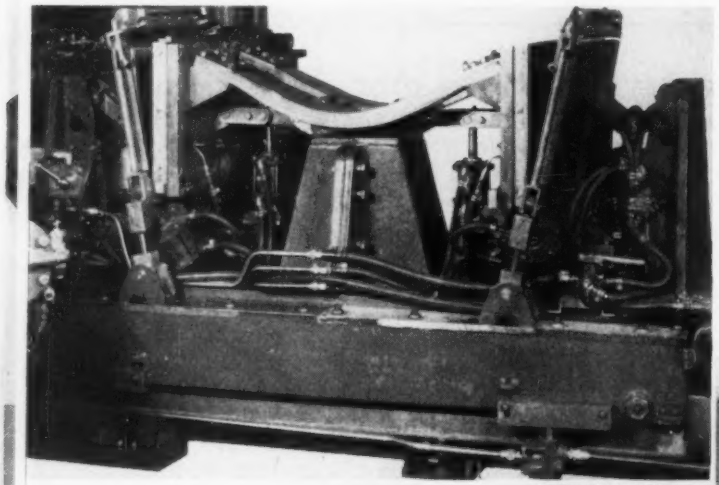


Fig. 1 (right)— Sheet metal compartment clamped in place ready for insertion into welder

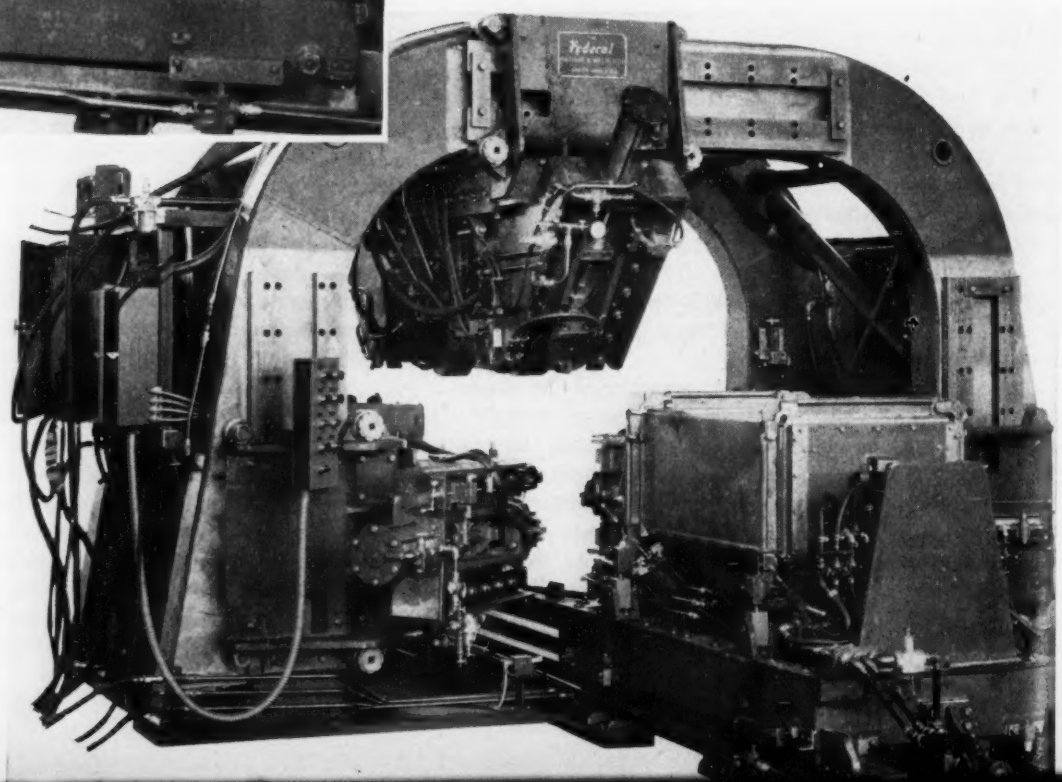


Fig. 2 (above)— Close-up of fixture in open position showing air operated clamps for holding metal compartment in place

HOW TO SELECT Quenching and Tempering Oils FOR TREATING STEEL

By E. L. H. BASTIAN
Staff Engineer
Shell Oil Co. Inc.
New York

In this second and final part of the article, the author describes total immersion quench methods for correlating comparative quench efficiencies with actual commercial experience, and discusses martempering, austempering, tempering, annealing and normalizing

TOTAL immersion methods of quench provide a good means of correlating comparative quench efficiencies with actual commercial experience. Quenching of SAE 1045 and 1095 steel cones into various media from a temperature of 1500° F is illuminating.

Fig. 4 shows hardness results by this method on SAE 1045 cones. These cones are ⅛ -1 x 5-inches long. After quenching, flats are ground on the side of the cone to determine surface hardness on rockwell C scale at various distances from the tip. It will be noted that all conditions being equal, there is a measurable difference in effects of different quenching oils by this method which compares with the differences noted by thermal methods.

Water and air as quenching media were included in these tests to definite extreme conditions. SAE 1045 was selected as a typical low carbon steel sensitive to cooling effects of quenching media employed.

Fig. 4—Hardness curves for ⅛-1 x 5-inch SAE 1045 cones quenched from 1550° F

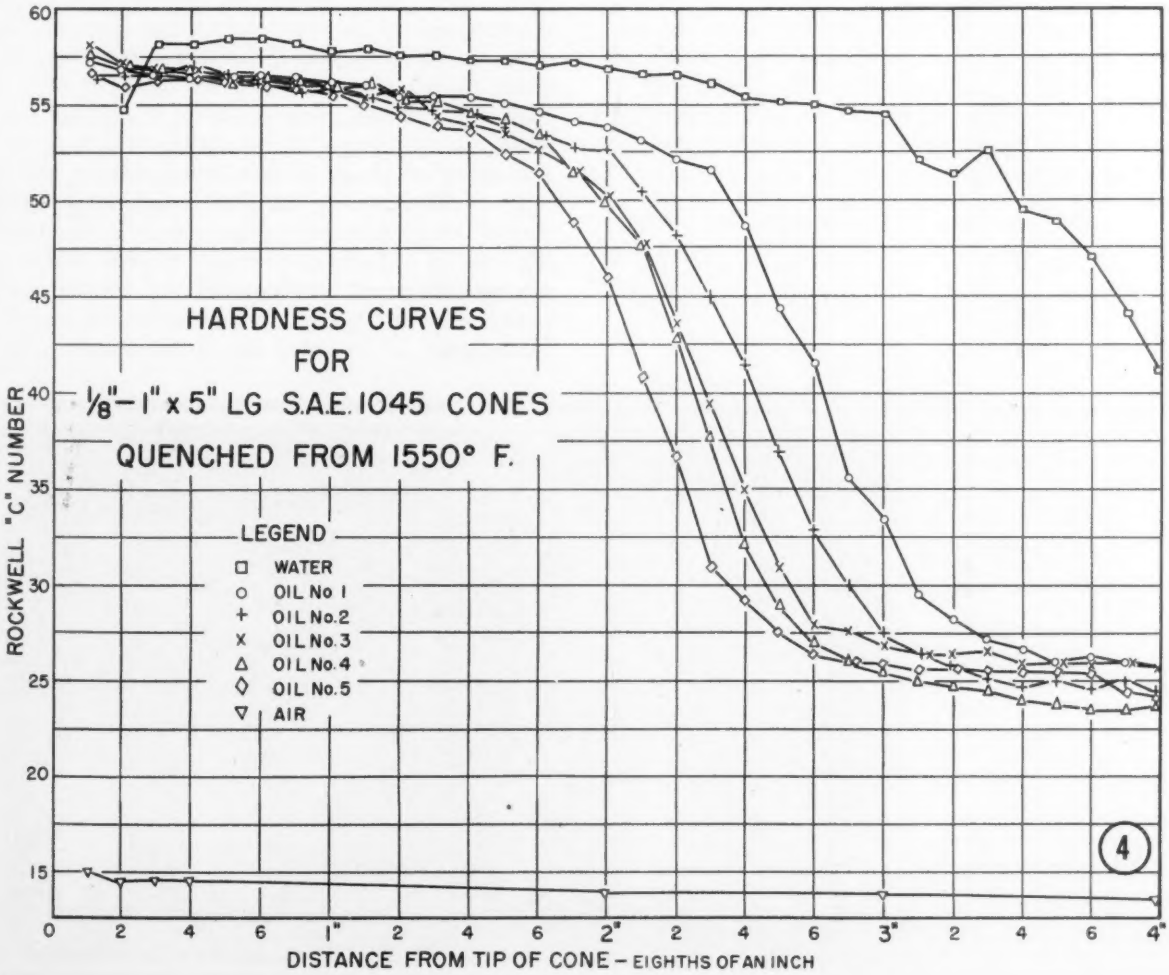


Fig. 5 shows SAE 1095 steel cones of the same size similarly quenched from 1550°F in the same fluids. The cones were sectioned after quenching, and the section surface etched in hot dilute hydrochloric acid. The dark areas are the hard martensitic structure. The light areas show the unhardened section.

Groups 1 to 5 in Fig. 5 were quenched in oils 1 to 5 (refer to Fig. 4) respectively. In other words, the hardening results obtained by quenching SAE 1045 and 1095 steels in the same series of fluids are directly comparable in the same order of merit.

Another method of test employed in evaluating quenching merit of a number of oils investigated was Grossmann's severity of quench (value of H) which was calculated from data contained in Fig. 4. Grossmann's hardness calculated for 50 per cent martensitic structure in an 0.45 per cent carbon steel is 42 rockwell C. Referring to Fig. 4, distances from the tip of the cone where rockwell C42 occurs were determined. Calculation of the actual diameter at these distances gives the critical diameter for each oil, or diameter D. From further calculation, referring to Jominy curves for SAE 1045 and Grossmann's curves in publications on the method, D_1 is determined. H values, (severity of quench) were then secured for the several oils as follows:

Water	H = 1.42
Oil 1	0.73
Oil 2	0.64
Oil 3	0.60
Oil 4	0.58
Oil 5	0.51

These values of H indicate rather considerable differences between oils, and demonstrate a trend in conformity with results secured by other methods.

Similar calculations for quenched SAE 1095 steel cones in the same fluids resulted in the following order of severity of quench:

	H-Value
Oil 1	0.79
Oil 2	0.70
Oil 4	0.69
Oil 3	0.61
Oil 5	0.58

It will be noted that H values are slightly higher and in the same order except for reversal of position of oils 3 and 4.

Various experimental projects have been undertaken to determine points of fundamental information relating to quenching oils. Interval quench tests on pure compounds representing paraffinic, naphthenic, and aromatic materials indicate that quenching efficiency appears to increase with increase in boiling point of the compound. This same work demonstrates some superiority of the paraffinic oil for high quench efficiency.

However, the effects of addition agents and special compounds appears to outweigh any differences attributable to paraffinicity. The principal advantage of the paraffinic type oil is with respect to resistance to sludging and premature deterioration in service. Tests on various viscosity oils (60-250 seconds @ 100°F-S.S.U.) indicate that the higher viscosity oils demonstrate more rapid cooling in the initial stages of quenching. This effect can also be secured by use of additive agents in a lighter oil. In the C stage of cooling, the higher the viscosity of the fluid, the slower the cooling rate, which correlates, of course, with commercial experience.

Experiments in varying the quench bath temperature within normal limits (80-140°F) for conventional total immersion quench (not interrupted) indicated an increase in cooling rate in the final or C stage of cooling as the bath temperature was increased. This is particularly true with the higher viscosity oils.

Additions of from 0.01 to 0.1 per cent of water to either straight mineral or additive type oils did not affect the quenching efficiencies of these oils. However, the addition of as much as 1 per cent water to some additive types of quenching oils reduces their quenching efficiency to that of mineral oil base stock.

In conclusion, on oil type quenching fluids, it may be said that their use is widespread and expanding due to (1) increasing use of alloy steels which are best hardened and heat treated with oil, and (2) availability and broad usefulness of oils in the heat treating field. One new use of oil in this connection

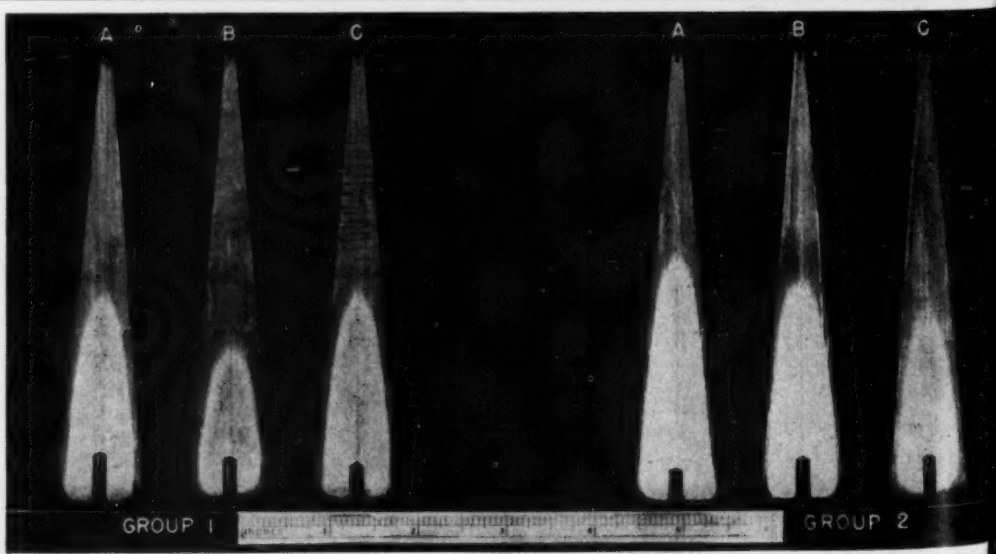


Fig. 5—SAE 1095 steel cones of same size as those shown in Fig. 4, similarly quenched from 1550° F in the same fluids. Cones were sectioned after quenching, and section surface etched in hot dilute hydrochloric acid. Dark areas are hard martensitic structure. Light areas show the unhardened section

is discussed in the next section of this article, martempering, a process heretofore accomplished with molten salts.

Martempering—Austempering—Both these hardening operations are of the type employing a quench bath at elevated temperature in which the work is held for a limited interval, removed, and cooled down to room temperature in another medium such as air. This may be followed in some cases by a tempering or draw operation. The quench medium used in martempering may be either oil or molten salt bath. Austempering, due to the high bath temperature (500-800°F) is always done in molten salts. Objective in either process is to secure optimum hardness combined with toughness and a minimum distortion of the workpiece.

Martempering—By using an elevated quench bath temperature, at or above the Ms point or beginning transformation temperature, the workpiece is quenched from austenitic temperatures down to the bath temperature and then held, allowing the piece to reach a uniform temperature throughout. Subsequent cooling in air down through the transformation range is, of course, at a much slower rate, which minimizes any tendency toward residual stresses. This form of interrupted quench practically eliminates strains and distortion which would occur with more drastic conventional quenching.

This factor permits a martempering treatment of finished machined pieces without excessive danger of cracks or dimensional changes due to quenching. Reason for this is the cushioning effect of soft ductile austenite untransformed to hard martensite at the point where cooling is interrupted (i.e., at the quench bath temperature).

While martensite commences to form at around 475°F, the complete transformation occurs through a temperature range down to below 200°F (dependent upon the steel composition). Martensite is only partially formed at a temperature of around 350°F. Much of the advantage of martempering can hence be utilized by employing bath temperatures on the order of 350°F. This fact permits the use of certain oils which are less expensive, as a rule, than salt baths,

TABLE III

TYPICAL PHYSICAL PROPERTIES
TEMPERING OILS

Typical Properties	Tempering Oil #1	Tempering Oil #2
Gravity °API	21.2	25.5
Color, NPA	Green Black	Dark Green
Pour Point, °F.	85	5
Flash, °F.	505	590
Fire, °F.	560	665
S.U. Vis. @ 100°F.	...	4300
S.U. Vis. @ 130°F.	1160	1458
S.U. Vis. @ 210°F.	162	208
Acid. No. TAN—C	0.05	L.T. 0.05
Conrad Carbon %	5.1	0.76

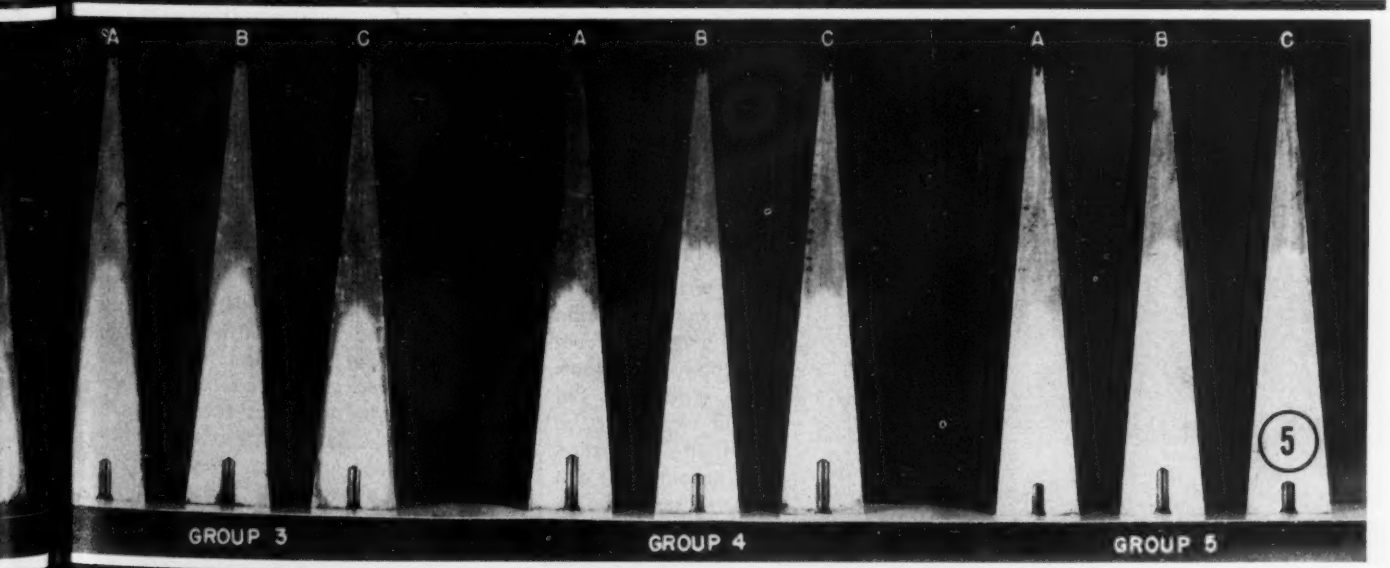
and also exhibit certain advantages. With oil, it is frequently unnecessary to draw back after quenching, and fixtures for holding long slender parts in the air cooling step are eliminated. Cleaning parts after quenching with oil is also less of a problem than with salt quenching.

Where liquid carburizing is employed, the workpieces must be cleaned before transfer from cyanide salts to salts based on nitrates as otherwise there is a real danger of explosion. The use of oil for the quench bath eliminates the need for this cleaning operation, resulting in further economies.

Oil used for martempering must have certain characteristics. It should possess: 1. High flash and fire points to avoid fire; 2. low volatility at quench bath temperature to avoid excessive losses, fogging, and smoking; 3. good oxidation stability at high temperature to prevent decomposition and sludge formation; 4. adequate cooling rate to secure fast quench from austenitic temperatures down to quench bath temperature.

Salt baths used for martempering have one advantage over oil in that they can be used at somewhat higher temperatures where steel composition is such as to have a high Ms point and it is desired to quench at this temperature. Salts are commonly used at bath temperatures of from 350 to 600°F for this purpose.

Austempering—This process is ordinarily done at bath temperatures of from 500 to 800°F. Salts are



always employed in the bath as the quenching medium. Austempering is particularly suited to treatment of high carbon alloy steels. It produces a transformation from austenite to bainite, a product intermediate between martensite and pearlite, and results in a structure combining good hardness, high strength and toughness.

Process is limited to certain steels having a higher content than about 0.60 per cent of carbon and other alloying elements. Low and medium carbon steels are practically impossible to austemper because of the critical tendency to form soft pearlitic structures under the conditions of the quench process. Naturally, the ability of the quenching medium to cool the workpiece rapidly enough throughout its mass to prevent pearlitic transformation is an important factor in the utility of the process. Hence, the proper combination of salts in the bath must be employed to secure the desired cooling rate.

As may be surmised, austempering and martempering have replaced the conventional quenching and heat treating procedure in many plants, subject, of course, to the limitations of these methods previously noted. However, there is every reason to believe that full quench procedures will continue their importance in the field, particularly where high as-quenched hardness is desired in low carbon and low alloy steels.

Choice of quenching medium and method of heat treating procedure must be based on individual plant needs which are best determined by the metallurgist. Account must be taken of (1) types of steel to be treated, (2) production demands, (3) hardening requirements, and (4) equipment available. There is an increasing variety of the latter available to the modern plant, some general purpose, some quite specialized in design for particular processes. No attempt will be made here to discuss this subject since information on heating units, furnaces and heat treating bath equipment of both continuous and batch types is thoroughly presented by suppliers in current technical literature.

Tempering—Tempering (or drawing) is a heat treating operation the purpose of which is to relieve quenching stresses in quench-hardened steel and restore a certain degree of ductility and toughness to the metal without losing an appreciable amount of the hardness secured by quenching. This is accomplished by reheating the hardened steel to a temperature somewhat below the critical temperature and holding at that temperature for a given time interval. The combination of hardness and toughness required in the finished piece determines the tempering temperature and time.

Carbon content and alloy constituents in the steel are also pertinent to the end results obtained under any given condition. Essentially, the toughness and stress relief secured in tempering are due to a change in constituents under tempering conditions wherein carbides are precipitated from the martensitic structure. They disperse and coagulate into spheroidal particles, the size of which depends upon both temperature and tempering time. The higher the tempering temperature used the larger these particles, and hence the greater degree of ductility and toughness obtained. Alloy steels tend to resist the effects of tempering and are, therefore, usually tempered at higher temperatures to secure the desired end properties.

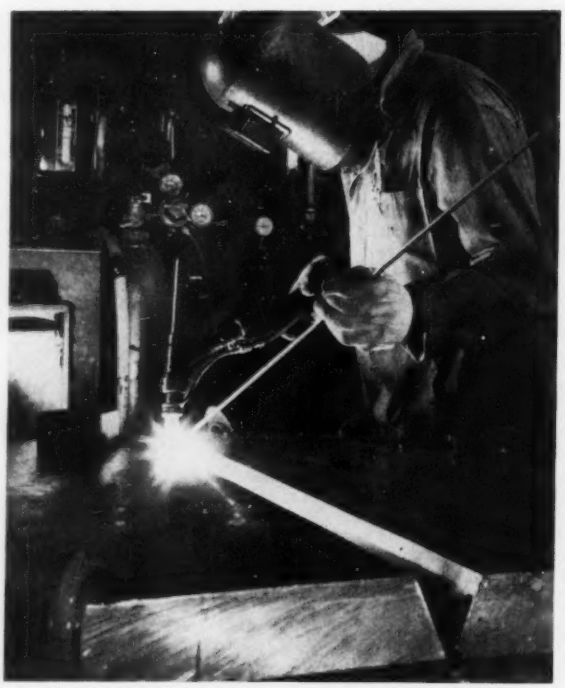
Hardness is measured by one of the conventional hardness testers, usually either brinell or rockwell. Toughness is evaluated by a notched bar test, usually the Charpy, wherein such a bar is struck by a weighted pendulum to determine the necessary energy to obtain fracture. This is a measure of toughness inasmuch as a brittle structure fractures readily under such conditions whereas a tough structure resists sudden fracture and requires expenditure of considerably more energy to break. A somewhat similar toughness test is known as the Izod test. Results by either test are measured in foot-pounds of energy.

Tempering is usually done as soon as possible after quenching since as-quenched pieces may be subject to very high internal stresses which would result in cracks or fracture unless these stresses are promptly relieved by tempering.

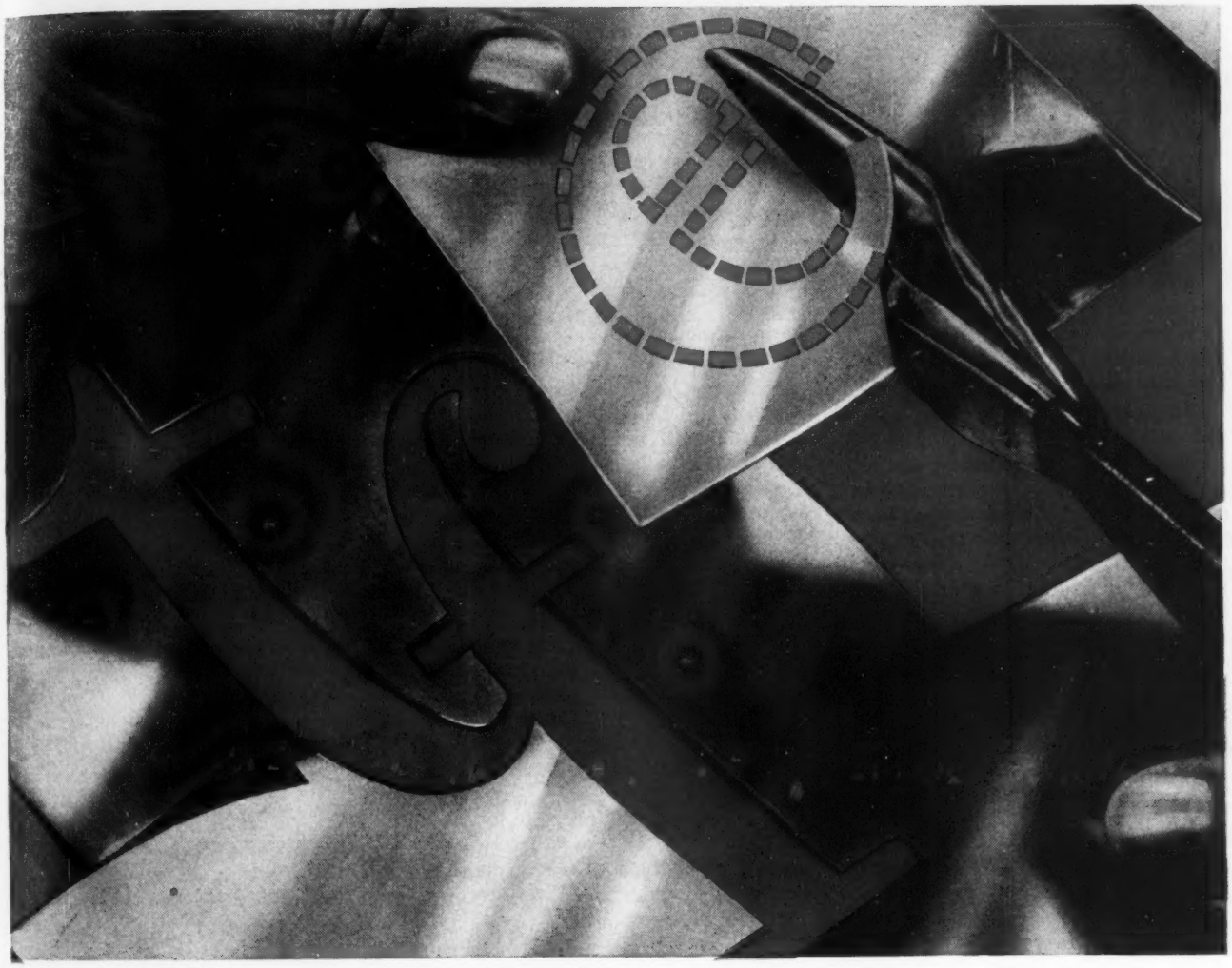
Tempering is done at various temperatures between 300 and about 1200°F, dependent upon steel composition and end results desired. However, some steels, both water hardening and oil hardening types, such as chromium, chrome-nickel, and chrome - vanadium, are subject to curious results if tempered between approximately 400 and 700°F. This is known as the "blue-brittle" range. At these temperatures, continued tempering produces a reduction in hardness but also a reduction in toughness. In other words, the steel becomes soft but also brittle. This is explained by the fact that quenched steel contains not only hard martensite but also a small amount of soft tough austenite which has been untransformed in the quench.

When the steel is tempered at 400°F to 700°F this austenite changes to a constituent, which dispersed through the martensitic structure, causes impact brittleness. Ordinarily, there is not enough present to increase hardness, but it does increase brittleness. Hence, the seemingly paradoxical results are obtained. By tempering above 700°F, this effect of brittleness is removed.

Another type of brittleness is en-



ALUMINUM SLAB WELDING: Joining 2½-inch slabs of aluminum alloy with argon shielded tungsten arc is one of techniques developed at Battelle Institute, Columbus, O., in a research investigation sponsored by Stacey Brothers Gas Construction Co., Cleveland. Until recently inability to weld thick plates of aluminum stymied design engineers in construction of plants for production of liquid oxygen to be used in production of gasoline from natural gas and oxygen



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countered at higher tempering temperatures (about 1100°F). It occurs frequently with high carbon chrome-nickel steels and is designated "temper brittleness." It is different from brittleness encountered in the lower temperature "blue-brittle" range (400 to 700°F) in that brittleness is not increased but neither is the desired toughness obtained. A remedy for this condition, when encountered, is to quench the steel rapidly from the tempering temperature. This produces the degree of toughness normally expected from the drawing operation.

Tempering Media—Various fluids and other media are employed for tempering. Among these are air, oil, molten salt baths, and molten metal, such as lead. These media have varying relative value for the purpose at different temperatures and for different size pieces. Small simple shapes are usually tempered in a fluid medium such as oil or molten salt bath. Large irregularly shaped pieces are often tempered by air in gas fired or radiant heated furnaces. Such a medium as air has a less drastic effect upon the piece introduced into the medium. If a liquid bath were employed, the sudden immersion of the piece in the hot liquid might set up initially detrimental stresses in the piece.

Thus air is frequently employed for high temperature tempering particularly for complicated shapes. Air may be used for tempering at any temperature. However, in the lower temperature ranges, air has a quite low rate of heat transfer. It should be circulated by fans which are ordinarily built into tempering furnaces for the purpose.

Tempering, Annealing, and Normalizing—While discussing air tempering, it may be desirable to clarify the differences between tempering, annealing, and normalizing. These are similar operations all employing air as a heating medium. Tempering has already been defined here as a process to secure toughness in a quenched hardened steel by reheating to some temperature below the critical temperature.

Annealing is a process of heating to either above or slightly below the critical temperature and then slowly cooling in air in order to secure a soft pearlitic structure. In full annealing (heating above the critical temperature) pearlite and a free constituent (ferrite or cementite, dependent upon steel composition), result upon subsequent slow cooling. The steel is consequently soft after the full anneal. The grain size of the steel is reduced by annealing also. This is desirable if good ductility is the objective of the annealing treatment.

In partial or "subcritical" annealing, the steel is heated to just below the critical temperature and air cooled. It is thereby softened, but not to the extent as in full annealing. Hardness and toughness are both secured by this operation on a previously hardened steel. It is in reality a tempering or drawing operation at a high temperature. Rate of cooling has no effect upon hardness or structure since the critical temperature has not been exceeded. A pearlitic steel so treated results in a spheroidized structure. Hardened martensitic steels also show presence of spheroidized carbides under the same conditions. This structure is useful in securing (in some steels) better machinability, and more uniform hardness upon subsequent treatment.

Normalizing is essentially the same as annealing above the critical temperature and then air cooling. Nature of structure and grain size obtained will depend upon (1) composition of the steel, (2) mass, and (3) rate of air cool (as affected by a fan circulation, air temperature, etc.). For all carbon steels, the structure will usually be pearlitic plus free constituents. The more rapid the cooling the finer the grain size.

Objective in normalizing is generally to secure finer grain size, more uniform structure, and (for certain steels for given applications) the normalized steel properties may be those desired as the end result. All normalizing, as well as annealing, is done in furnaces as liquid media are not adaptable for these processes.

Tempering in Liquids—Tempering liquids commonly used, as previously mentioned, are oil, molten salts, and molten metal (lead). Tempering oils are widely employed in low temperature (300-450°F) operations. Oil has an advantage over molten salts in that with the latter it is necessary to wash off the salts subsequent to the draw.

For best service, tempering oils should possess good high temperature characteristics. Flash and fire points should be high enough to minimize fire hazards at service temperatures. The oils should not volatilize readily. This is to prevent excess oil consumption and smoking. They should have good oxidation stability at service temperatures to avoid deterioration and sludging. Typical oils used for tempering are heavy viscosity steam refined or bright stock oils. Viscosity at service temperature is usually sufficiently lowered to minimize oil carry-off and thus reduce consumption.

Physical properties of two such oils are shown in Table III. Oil No. 1 is a conventional steam refined stock. Oil No. 2 is a heavier bright stock of premium quality for this service. It is preferable to No. 1 oil by virtue of better thermal stability and oxidation resistance at tempering temperatures. Liquid media of this type (both oils and molten salts) heat readily and produce uniform results on immersed steel parts. For low temperature drawing of small simple shapes, these oils and molten salts are superior.

Molten lead is also used in tempering at high temperatures (1200°F) where it is desired to secure the softening effects of the high temperature draw, particularly on alloy steels. Molten salts, as well as air, are, of course, also extensively used for high temperature drawing work (i.e., above 650°F).

The author wishes to acknowledge as a source of valuable information the quenching oil development work done at Armour Research Foundation under the sponsorship and active co-operation of Shell Oil Co. Inc.

Continuous Stamping Increases Blower Output

Blower wheels for air moving, cooling and heating equipment are being mass produced from strip steel in a continuous stamping process by Utility Appliance Corp., Los Angeles. Three presses using double action dies first cut the steel strip and then form it. An automatic continuous feeder for presses, designed and built by company's engineers, supplies steel strip of desired width.

Both blower end rings are welded to blades at same time using continuous welding equipment developed by the company. Blade width is proportioned to each wheel diameter instead of using one standard blade width for various size wheels. Fatigue resistance of metal is increased by turning blades with a large radius for junction with end rings.

—o—

Of great usefulness to piping engineers is a slide rule called the velocity and pressure drop calculator designed by Tube Turns Inc., Louisville. It gives two kinds of answers: A quick estimate based upon a pipe friction factor of 0.006 and an accurate solution derived from the estimate by applying a correction factor to the straight pipe losses. One part of rule is devoted to liquids and another to gaseous fluids.

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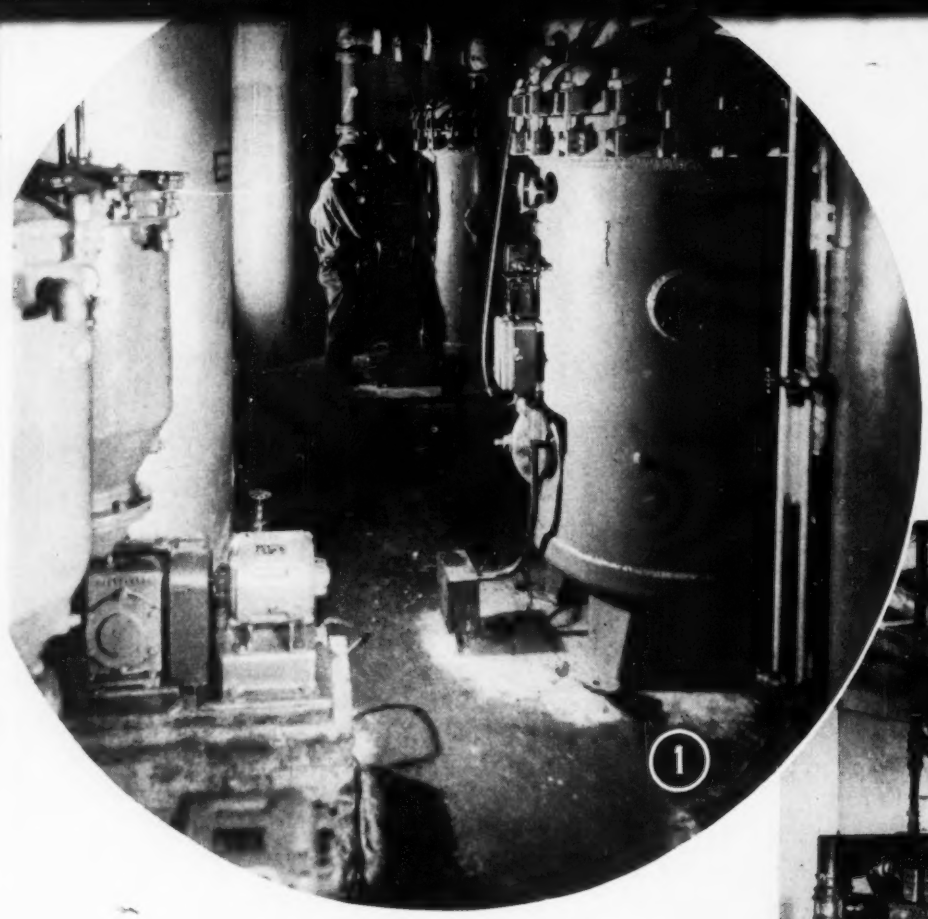
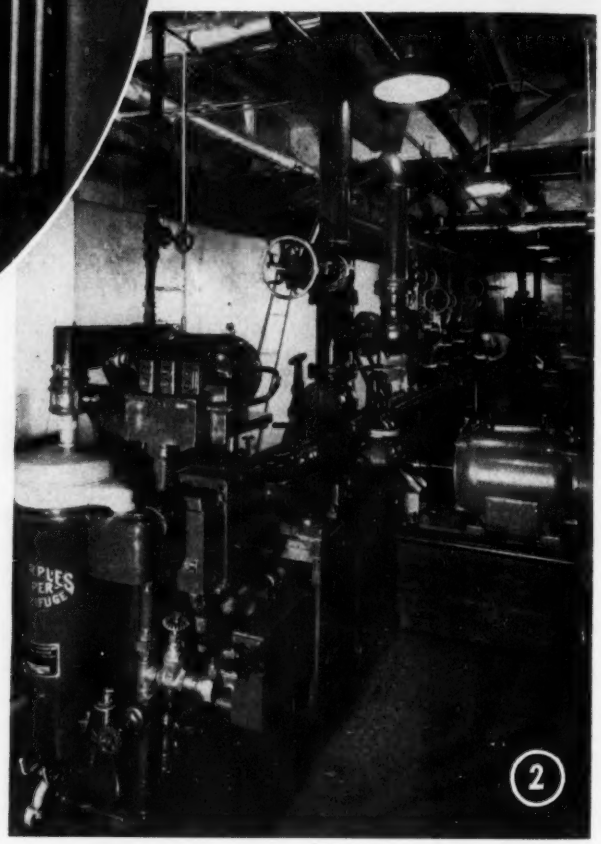


Fig. 1—Meter room, located directly above the oil cellar, contains grease pumps, oil coolers and filters which process all oil used in the back-up roll bearing and pinion and drive systems. Behind inspector is located cooling tanks where oil is brought to 100° F before being pumped to mill

Fig. 2—Tanks at left contain lubricant for back-up roll bearing system and in left foreground is seen centrifuge for cleaning oil in one tank while other tank is in use



Latest Lubrication Developments

...applied to world's fastest cold strip mill

RECENTLY installed 36-inch continuous 5-stand tandem cold reduction mill at the Aliquippa plant of the Jones & Laughlin Steel Corp., Pittsburgh, utilizes four separate lubrication systems in performing its 70-mile-per-hour operation. This world's fastest installation, delivering its coiled product at the unprecedented speed of 6250 feet per minute, must use large capacity lubrication systems.

Huge back-up rolls are lubricated by a special recirculating oil system. A similar type system supplies oil to the drives and screw downs during rolling. Extreme pressure grease is utilized in the lubrication of the work rolls. Palm oil coating which the strip receives after pickling and prior to cold rolling requires yet another system.

Oil reservoirs for the back-up roll bearing system consists of two 14,000 gallon tanks for holding and maintaining oil at a constant temperature of around 110° F which is effected by a unique steam system through which the oil is circulated. No heating pipes are used in the tanks. Two 285-gallon capacity pumps arranged so that one pump is in continuous operation, the second being held in the event of a pressure drop, moves the oil from the tank. Upon leaving the tank, oil is forced through a filter with multirotating cylinders having 0.005-inch openings which are automatically self cleansing. If at any time the pressure differential exceeds 10 pounds, an automatic warning signal notifies the operator and when 18 pounds is reached, oil automatically by-passes the filter. Leaving the filters, oil passes through coolers, which maintain an even temperature of 100° F throughout the bath, eventually being piped under controlled pressure to the back-up rolls. Back-up rolls when turning at high speeds, are actually suspended on a microscopic film of oil which is also circulated through the bearing shell and used as a coolant after which it returns to the reservoir. Operators watch the automatic recorder on which oil temperature is continually registered to guard against any abnormal rise which indicates trouble within the bearing. Any sudden drop in oil pressure activates red and green lights located on the mill itself. When oil becomes contaminated its reservoir is immediately taken off and the other

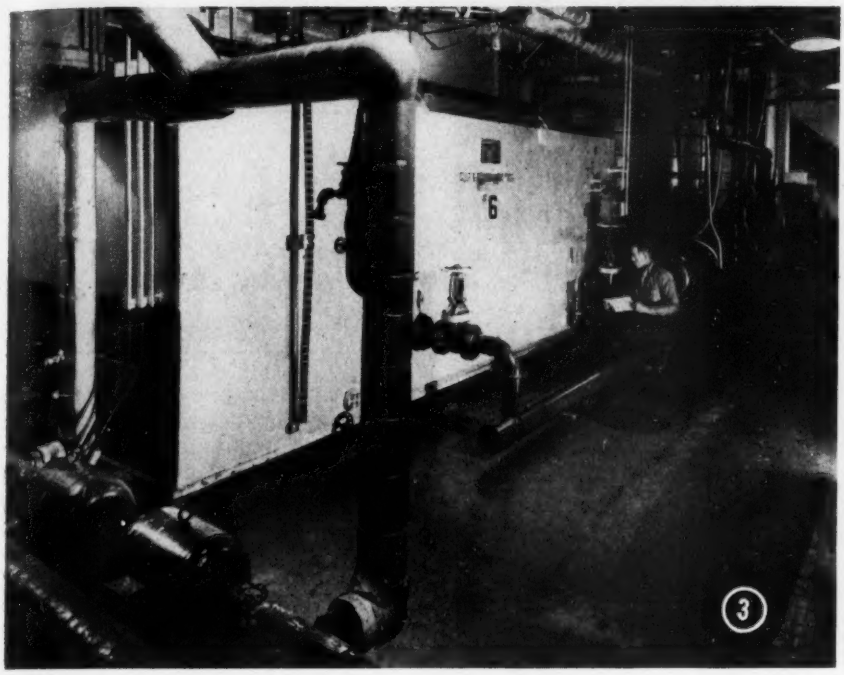


Fig. 3—View showing oil reservoir for pinion and drive lubricating system with palm oil pumps in left foreground

tank put into service. Lubricant remaining in the contaminated tank is pumped to a scavenger tank and heated, following which it is slowly passed through a centrifuge whirling at 15,000 revolutions per minute for contamination removal, after which it is returned to its reservoir for use when the second tank becomes contaminated.

A similar system for the pinions consists of one 8000 gallon capacity tank where special extreme pressure oil for lubrication of drives and screw downs is contained. Circulated by two 200 gallon capacity pumps through filters and a cooler identical to those used for the back-up roll bearing system, the lubricant may also be cleaned upon return by passing through a recirculating filter system.

Grease pumps supply extreme pressure lubricant to the work roll bearings and back-up roll thrust bearings in predetermined amounts and at definite time intervals. Desired proportions of water and palm oil are tank mixed and pumped to the mill by 42 pumps which distribute the mixture to the strip at a predetermined rate while material is in motion.

Spreader rolls located on top and underside of the strip facilitate the application of the mixture. After use, palm oil and water mixture is pumped through a recovery system to reclaim palm oil for subsequent usage. Automatic fire control apparatus is installed in the oil cellar in the event of fire imperiling the lubrication system. This system will flood the entire area with 2 tons of carbon dioxide at a temperature of about 0° F for a period of 2 minutes. Planned under supervision of Mesta Machine Co., Pittsburgh, the installation of the entire system was made by the S. F. Bowser & Co. Inc., Fort Wayne, Ind.

Arc Welded Design Saves Production Time

Construction of a huge rotary press of arc welded design for Fernstrom Paper Co., Pomona, Calif., is reported by Hobart Brothers Co., Troy, O. This is the first time that a machine of this type was constructed of steel plate by arc welding.

Main frames were flame cut from 2½-inch steel plate. Pads of 1 inch steel plate were arc welded to shape and machined to within 0.001-inch to assure good alignment.

Previous models of this press which is 30 feet long, 15 feet high and weighs 35 tons were made of castings with side frames 6 inches thick. There are more than 400 welded parts in press, and pattern savings are estimated to be in excess of $1000. At least 40 of 52 rolls in press are of welded construction with the largest roll being 30 inches in diameter. This 2-ton roll is fabricated from 1-inch steel plate, rolled to diameter and arc welded.

Press was specially designed and constructed by Johnson & Thomas Machine Works Inc., a West Coast firm, and installed 10½ months after it entered their engineering department. According to the customer this was just 13 months less than time required to build previous models.

Powder Metallurgy Techniques Described

Fabrication of metal parts involving compaction or "briquetting" of metal powders into molds under pressure followed by "sintering" or heat treating to produce finished article results in maintenance of close tolerances, shorter manufacturing time, less scrap waste and higher production rates according to report of Office of Technical Services, Department of Commerce, Washington. Method used for fabricating parts ranging from 0.001-ounce to 95-pounds in weight and from 0.001 square inch to 20-inches in diameter are described.

Powder metallurgy production methods are detailed with emphasis on factors which affect design, engineering and physical characteristics. Drawbacks of method such as costly equipment, costs of raw materials, tool and die costs and special plating problems are also included.

Shaft Hardening Done Automatically

Production of 240 hardened drive shafts or 360 propeller shafts per hour for outboard motors is being done by Champion Motors Co., Minneapolis, with negligible distortion, scale formation and decarburization using induction heating equipment for selective hardening. Equipment consists of one model 1070 induction heating generator and one single position work table with progressive feed and spray quench manufactured by Induction Heating Corp., Brooklyn.

Work is loaded with fixture carriage in up position and progresses downward through inductor block and into spray quench. Upon completion of hardening operations, fixture automatically returns to up position for unloading and reloading. Surface hardening in drive shaft is restricted to gear spline sections at each end which are hardened to 50-53 points rockwell C to a depth of 0.040 inch in 10.75 seconds. In the propeller shaft, center section is similarly surface hardened in 7 seconds.

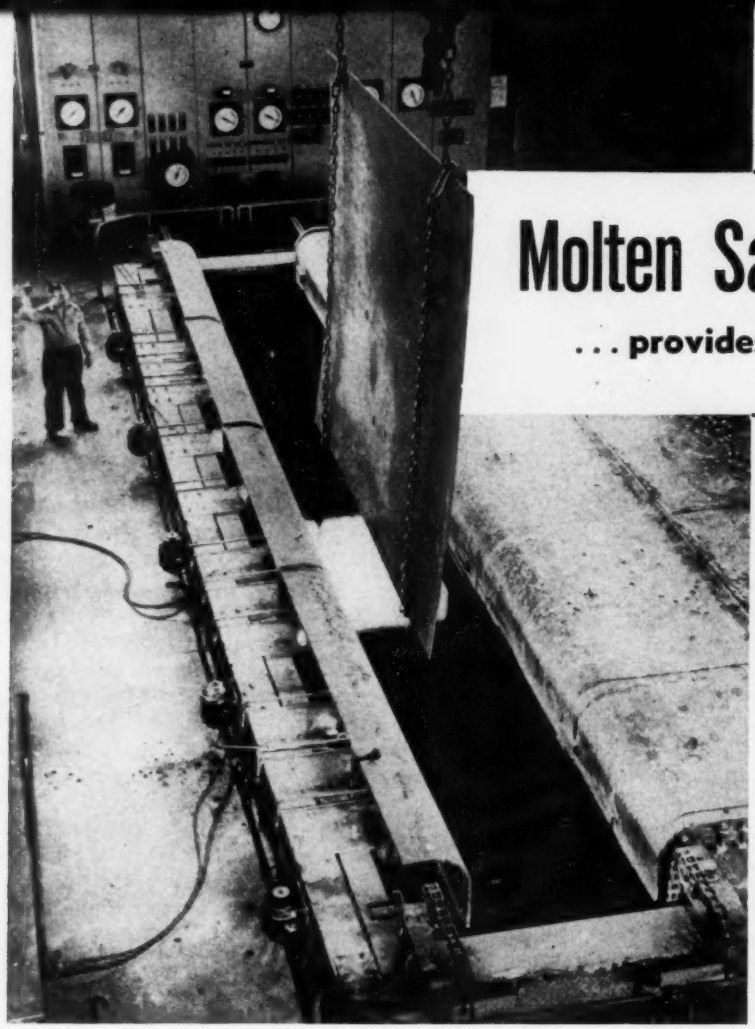


Plate entering electrically-operated molten salt bath descaling furnace

Molten Salt Bath Descaling

. . . provides greater metal savings

PROBLEM of scale removal from hot-rolled clad plate and sheet, including stainless, nickel and Monel, was recently solved at Lukens Steel Co., Coatesville, Pa., by adoption of the molten salt bath descaling process. This system supplanted a previous process for scale removal, and already is showing many technical and economical advantages. Great savings in metal result since the salt bath treatment removes only scale and does not attack the base metal. Scale removal time is materially reduced and more uniform descaling results without attendant pitting or hydrogen embrittlement.

Involved in the process is an Ajax Hultgren electric salt bath furnace as shown in the accompanying photograph. The bath, consisting of molten sodium hydroxide with the addition of sodium hydride, has working dimensions of 40 feet in length by 4 feet in width by 11 feet, 6-inches salt depth. So far as is known, this is the largest salt bath ever constructed. It has a power input of 800 kw, being heated by the immersed electrode principle. Designed and manufactured by the Ajax Electric Co., Philadelphia, the furnace has 165-ton salt capacity.

Descaling process is extremely simple. Work is placed on suitable racks in such a way that all surfaces are accessible to the bath. Pieces are held in the bath, which operates at 700° F, until reducing cycle is completed. Time varies from 8 to 20 minutes depending on thickness and weight of the plates as well as particular type of material to be cleaned. After scale is completely reduced and while still hot, the piece is immersed in water. This removes a large portion of the reduced material. High pressure water rinses remove loosely clinging material as well as all traces of caustic soda. Next, an acid flash dip renders the surface bright for subsequent high pressure rinse to remove any remaining trace of smut or acid.

Flame Softening Triples Chain Pin Production

Solution of a production bottleneck in a process for end softening case hardened roller chain pins at Union Chain & Mfg. Co., Sandusky, O., was accomplished recently with an automatic oxyacetylene flame-softening unit. Production was increased 300 per cent over process formerly used with a completely automatic unit in which depth of softness is accurately controlled.

Engineers of Air Reduction Sales Co., New York, designed special extensions used with No. 9903 torch. A No. 2 tip placed about 1½-inch away from $\frac{7}{16}$-inch diameter roller chain pin softens cottered end to a depth of $\frac{1}{16}$-inch. A subsequent operation flattens head on softened end of case hardened pin.

Labels Guarantee Compressor Quality

Manufacturers of tank mounted air compressors, both single and two stage from ¼ to 10 horsepower, of types and sizes ordinarily used in automotive industry, who are members of Pneumatic Automotive Equipment Association will use the association label on their product signifying that the compressor complies with all requirements of the Commercial Standard as issued by Bureau of Standards, according to the association. Initiative of individual manufacturers in exceeding requirements of standard in design, performance or other characteristics of the tanks is not restricted as standards set are a minimum.

Definite size classifications for compressors, motors and tanks have been set and uniform laboratory testing methods are specified. Capacity is defined as actual volume of air compressed and delivered at a definite discharge pressure expressed in cubic feet per minute at ambient conditions. Overall efficiency is expressed in terms of cubic feet of actual air delivery per kilowatt hour input to motor. All tanks are to conform to the American Society of Mechanical Engineers' code and must have a safety valve and drain.

15 K. W. TOCCO unit brazing tools.

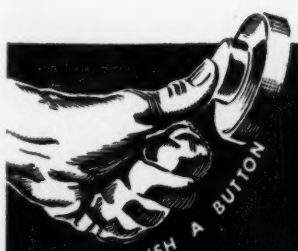
with TOCCO* Induction Heating

A large midwestern manufacturer of automotive parts reports the following savings from salvaging high-speed lathe tools with TOCCO induction heating:

> "The large tool shown here costs $17.00. It is eight inches long but formerly was discarded after four inches had been used. Now we use it all; the four inch stub is TOCCO-brazed to a four inch shank and we have a new tool for the cost of grinding and brazing—46¢, of which only 6¢ is the cost of TOCCO-brazing.
>
> "This process, applied to the many high-speed tools we use, provides a monthly savings of $2,000. The TOCCO Machine paid for itself completely in less than two months."

TOCCO Engineers stand ready to analyze *your* soldering, brazing or heat-treating problems to produce similar cost-cutting results.

THE OHIO CRANKSHAFT COMPANY



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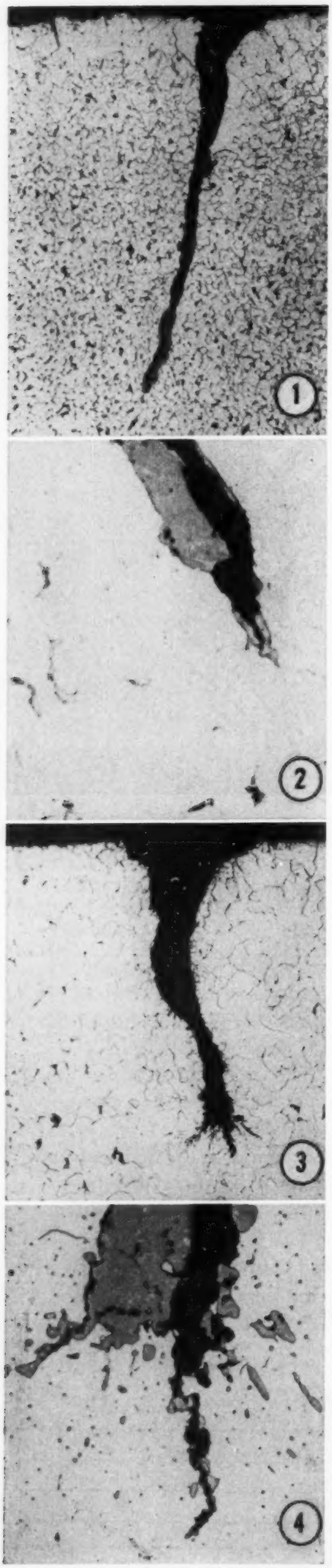


Determining Origin of Surface Defects In Rolled Steel Products

By V. E. ELLIOTT and C. L. MEYETTE

Metallographist *Supervisor of Research*

Gary Steel Works
Carnegie-Illinois Steel Corp.
Pittsburgh

SURFACE defects may be classed as either of mechanical origin, such as those which occur in the heating and rolling operations, and include breaks, tears, guide marks, mechanical laps and the like, or they may have been present in the ingot before heating and rolling. Examples of the latter type are ingot cracks, blowholes, scabs, and inclusions which lead to the numerous known types of seams and surface flaws. Most common types of surface defects and methods for their identification by visual examination or by the aid of macro-etch tests are well known. Conditions which caused their formation are also appreciably understood and this knowledge has been instrumental in the establishment of methods for metallurgical control.

In this discussion the term "mechanical type defects" will be used to designate those occurring as a result of rolling operations encountered in reduction from ingot to billets, blooms, or slabs or in rerolling to finish products. The term "steel defects" will be used to designate those that were present in the ingot prior to primary rolling or that were in the semifinished product prior to secondary rolling to finished product.

Basis for distinguishing between the two types of defects lies in the relative degree of subscale formation surrounding them. Subscale is defined as a zone of oxide particles precipitated and dispersed within a metallic matrix which has occurred by diffusion of oxygen inward from the metallic surface. Routine examination by means of the microscope of a large number of cases, has revealed that diffusion of oxygen from the scale formed within the defect during heating and rolling varies in degree, depending upon the time of contact between scale and metal. Where defects were present prior to heating, as in the case of steel type defects, time of contact will be long, depending upon the period required to bring the steel to rolling temperature, with oxide diffusion being correspondingly great. Where defects were formed during the rolling operation, as in the case of mechanical type defects, time of contact between the metal and scale formed within the defect will be short, depending only upon the time needed for rolling and cooling the steel. Since the average temperature is lower during rolling than during heating, opportunity for oxide diffusion will be correspondingly smaller.

The study was conducted along three lines: (1) To demonstrate the diffusion of oxide from scale-packed holes, (2) to observe the extent of oxide diffusion adjacent to artificially prepared defects, and (3) to apply the method of examination to actual cases.

Ten Grades Studied—Samples from ten commercial grades of steel were obtained for this study. Eight of the grades were basic open hearth steels chosen to represent rather wide variations in carbon, sulphur, silicon, nickel, chromium and molybdenum. The other two were electric furnace, stainless steels. Samples of each grade were obtained in hot rolled billet form.

Using billet samples ½-inch in length and of ⅛-inch diameter, a hole was drilled in each perpendicular to the billet surface to a depth of one inch and then packed with scale obtained by heating representative samples of the respective grades at 2150°F, then removing the scale and

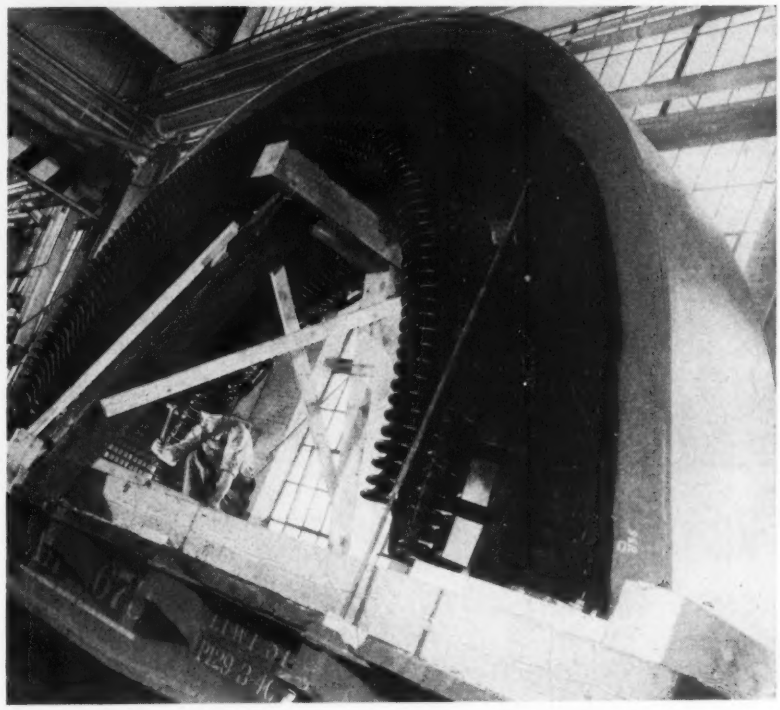
Photomicrographs showing difference in degree of iron oxide penetration within mechanical type and steel type synthetic surface defects in AISI C-1015 steel. Samples heated for 3 hours at 2150° F. Etched in nital

grinding it to pass an 80-mesh sieve. Holes were then plugged with a steel rod and welded to exclude air during the subsequent heating operation. All prepared samples were then heated in an electrically operated and controlled furnace for 1 hour at 2150° F and air cooled, after which a cross section was cut through the scale packed portion of each hole. Sample was then mounted in bakelite, and polished by usual methods for microscopic examination. No etchants were necessary since oxide penetration was clearly revealed after polishing.

Considerable diffusion occurred in all grades, with the exception of the 18-8 grade stainless steel, which revealed only a small amount of oxide penetration. With this exception, oxide appeared as a band of fine precipitate parallel to the edge of the exposed surface. Penetration was more random and extended to a greater depth in the plain carbon and AISI A-4068 grades than in other alloy grades where penetration was more compact and showed evidence of outlining the grain boundaries. Variations in depth or character of the penetration are, however, of less concern than evidence of penetration or lack of it in the various grades of steel selected. Evidence of oxide penetration from scale to surrounding metal is either lacking or is present in the metal adjacent to defects, depending upon whether they originated during or prior to rolling.

Produces Synthetic Flaws—To produce mechanical type defects, billet samples 3 inches in length from each of the grades of steel were used. Samples were heated at either 2000 or 2150° F for periods of 1 or 3 hours, after which they were removed from the furnace and immediately notched ⅛-inch deep on one surface along the center line in direction of rolling, using a V-shaped cutter and a sledge hammer. Billets were reduced 50 to 80 per cent in section on a 6-inch laboratory rolling mill. Samples were air cooled from the rolling temperature, with the exception that the high hardenability alloy grades were slow-cooled. Sections for microscopic examination were selected in a manner to include a cross section of the notch. To produce steel type defects essentially the same procedure was followed, except that the samples were notched before instead of after heating at 2000 or 2150° F for periods of 1 or 3 hours.

Fig. 1 illustrates a characteristic mechanical type synthetic defect photographed at 70X. Fig. 2 shows the lowermost portion of the same defect photographed at 400X. Both illustrations reveal essentially no evidence of oxide penetration.



HALF CARLOAD: Being readied for shipment to a west coast utility is top half of a stator for 33,000 kilovolt ampere, 90 per cent power factor, 13,800 volt, three phase, 225 revolution per minute, hydroelectric generator made by Allis-Chalmers Mfg. Co., Milwaukee. This 11 foot 5 inch high stator weighs 34,000 pounds and has a span of 26 feet

Fig. 3 illustrates a characteristic steel type synthetic defect photographed at 75X and Fig. 4 again shows the lowermost portion of the same defect photographed at 400X. In both illustrations, the penetration of oxide is in evidence, and the pronounced difference in the two types of defects becomes quite apparent upon comparison of the two photographs at high magnification. In both illustrations, oxide penetration is in evidence, and the pronounced difference in the two types of defects becomes quite apparent upon comparison of the two 400X photomicrographs. This characteristic difference has applied to all cases examined.

Examining Defects—To illustrate the application of the method of examination to actual cases, a number of billet samples representing several grades of steel were obtained from material that had been set aside for surface conditioning. Where surface defects were found, sections containing them were cut from the billets and, without further treatment, the sections were polished, etched, and examined under the microscope. This method should be readily applicable to the examination of defects in almost all grades of primary rolled steel products, although there may be some grades like the 18-8 stainless steel that do not respond.

The method may also be applied to secondary rolled products, although it will be well to consider a limitation of the method in this respect. Surface defects in rerolled products which have occurred solely as a result of the secondary rolling operation may be classed as mechanical type defects. Those which existed prior to secondary rolling, whether they occurred as mechanical type defects from the primary rolling or whether they carried through as existing defects from the ingot or from heating operations for primary or secondary rolling, may be referred to as steel type defects. This means that the method is not usable for tracing the origin of defects in either finished or semifinished products to conditions that may have existed prior to the heating operation for either kind of rolling except that it may usually be inferred that defects of the nature of those being considered generally do not occur from heating operations. Where, for example, the steel has been "burned" while heating for rolling, such cases may be determined by visual inspec-

tion or other usual means.

Rolling Removes Evidence—Consideration has been given to the possibility that subscale formed on the surface metal as a normal result of scaling during the heating operation may become entrapped within a mechanical defect such as a lap and, as a result, the flaw may be misjudged as a steel type defect. This condition was not observed in the work on synthetic mechanical type defects, except in the case of the high silicon, A-9260 grade, where entrapped oxide was noted on the samples which had been notched prior to rolling. However, when mechanical type defects were formed after the billets of A-9260 had been given two light passes through the rolls, no oxide penetration was evident around the defects. This fact considered with the oxide penetration observed around steel type defects indicates that roll action in breaking and removing scale will also remove any trace of penetrated oxide unless it has occurred within an existing flaw.

Attention is directed to occurrence of metal decarburization adjacent to both types of defects. Generally, decarburization is less in the cases of mechanical type defects due to lower temperature and shorter time at temperature during rolling than during heating. Since, however, degree of decarburization is itself a function of time and temperature being variable for the different grades of steel, it will be a less reliable guide to a determination of defect origin than will occurrence of oxide penetration.

Presented before American Institute of Mining and Metallurgical Engineers, New York, Feb. 19, 1948.

—o—

Stabilized zirconia, a new material with high melting point and excellent heat shock resistance was recently announced by Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

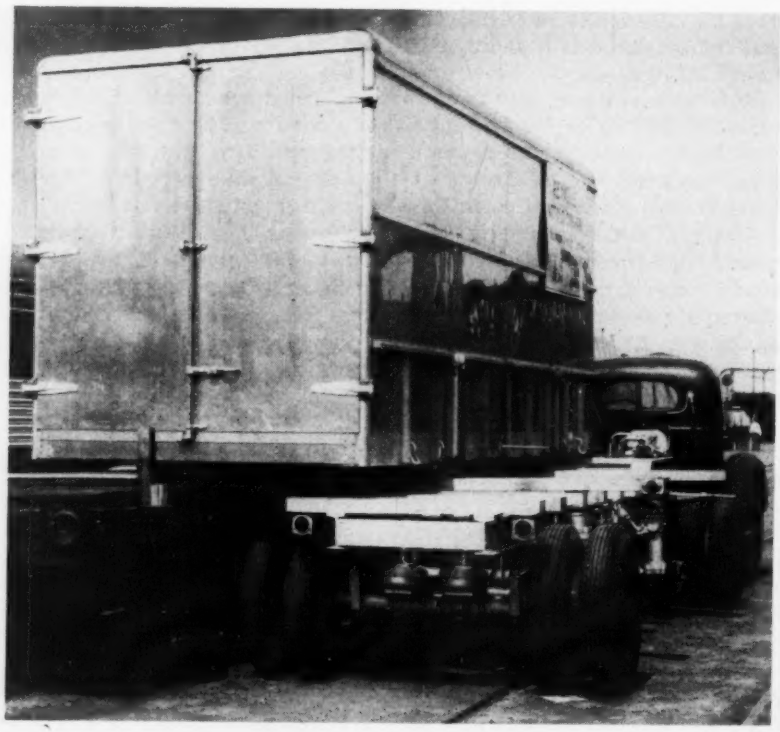
Railroad Handling Method

CUTS SHIPMENT COSTS

SOMETHING new in railway freight handling is the movable aluminum truck-trailer body developed recently by Reynolds Metals Co., Louisville. Designed to handle loads up to 20,000 pounds, the units are transported between shippers' loading docks and freight yards on special frames, and are shifted mechanically to standard type flat cars by means of built-in hydraulic lifts and winch and cable arrangement as shown in the accompanying photograph.

At the destination they are shifted back onto trailers and delivered to consignee's door. With such self-contained units, much costly handling, unloading and reloading, is eliminated and time in transit is reduced. According to the manufacturer savings possible with use of the movable trailer body range from $4 to $10 per ton depending on type of materials handled, and whether intermediate sorting is required.

Essentially a detachable trailer body 20 feet long, 8 feet wide, and 8 feet high, the unit referred to as the Trailerail, is constructed of strong light aluminum. It is mounted on carriages that retract or expand by manually-operated hydraulic rams which permit the containers to be driven alongside any flat car or platform and rolled from truck trailer to flat car or car to truck.

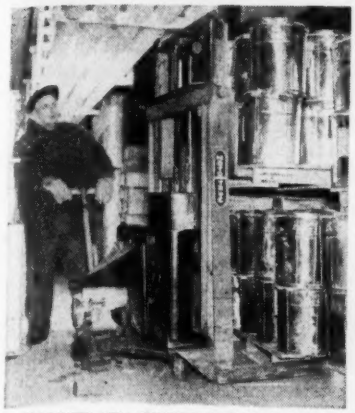


No special equipment other than that on the tractor-trailer and container is required. Entire operation is handled by one man in a few minutes. Furthermore, two containers can be carried on an ordinary flat car.

Exterior of the unit is made of R301 aluminum alloy. Framing members are extruded of R361 aluminum alloy. Riveted throughout, the container features two riveted aluminum rub rails on sides and front and one rub rail on the roof.

Railroad men realize that less than carload traffic is being handled at a loss because of high freight house and transfer expense, light loading of cars, high ratio of loss and damage and expensive switching and train service. Increases in rates are still behind increased costs. Additional increases are now being sought, but many railroad men and shippers believe that less than carload rates are about at their maximum limit, and that further increases, or even maintenance of present levels will drive more traffic to other forms of transportation.

Experimental runs between Chicago and Memphis, Memphis and Louisville, and Louisville and Birmingham demonstrated the feasibility of making freight deliveries between those cities the next business day after their pickup at the point of origin. Twelve of these units are being placed into service on the Illinois Central railroad on the Chicago to Memphis run.



PALLET STACKING MOTO-TRUC

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THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 32
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PALLET STACKING MOTO-TRUC

Profile Milling– *Concluded from Page 77*

Depth of cut was ¼-inch with each revolution of the roll. Time required to complete one profiling cut around the clover leaf was 7½ minutes from start to finish. Machine ammeter readings showed power consumption to range from 12 to 15 horsepower.

Design of the cutter blades in this initial test would not permit taking heavier cuts. However, cutter blade angle has now been changed and more metal is removed with each pass of the cutter.

The second step in machining this pod is clearly indicated by the finished half. This surface is produced with the sectional slab mill. In this instance the finishing cut taken was 0.010-inch for a length of 4 inches. Suitable driver finish was produced with one pass of the sectional slab mill.

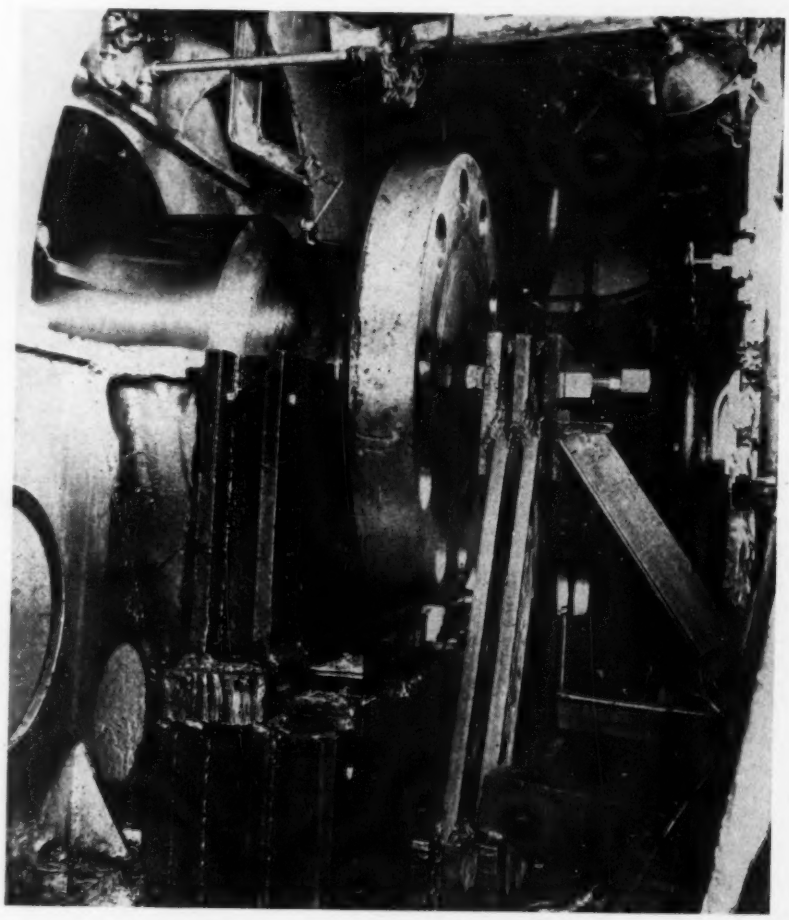
Floor Type Horizontal Boring Machines Adaptable for General Rolling Mill Machining Operations—Preceding information describes in some detail the roll holding fixture, tracer control attachment and carbide cutters used in shaping roll pods. It is important at this point to realize that the operations outlined are made possible only through the adaptability of the horizontal boring, drilling and milling machine for this class of work. On no other type of machine tool would it be possible to mount the roll holding fixture as illustrated. This means the fixture can be readily positioned so that the axis of the roll and the axis of the machine spindle are parallel one to the other.

When necessary, merely turning the roll-holding fixture 90 degrees presents the work at right angles to the machine spindle. Since there are no interfering machine structures to limit roll length or diameter, it is obvious that maximum roll handling capacity is determined only by the floor plate area. This can be increased to accommodate any length roll or any size workpiece.

Undoubtedly the most advantageous feature of the horizontal boring machine in any steel mill machine shop is its unusual flexibility in handling a broad range of work. Machining roll pods is only one of many jobs which can be handled by this versatile machine tool. Bear in mind that the fixture and attachments heretofore mentioned are used on standard horizontal boring machine. They can be rapidly adapted to perform different profiling operations, and are removed equally fast when this type of work is completed. The machine is then ready to perform a wide range of boring, drilling, milling, tapping and even turning operations.

Through the different standard movements of the floor type machine, practically any work pattern can be handled provided the part is capable of being placed within the range of the machine spindle. Oftentimes this is simplified by the longitudinal traverse of the machine column on its runway, vertical headstock movement and in-and-out spindle feed. As a result of the machine's versatility and feed movements, it is possible to repair and maintain all kinds of mill equipment, to recondition and rebuild old rolling mills and to fabricate all types of mill components, without resorting to use of special or single purpose machine tools.

In addition, to having the necessary capacity to handle all types of steel mill work, the horizontal boring machine cuts down the overall or floor-to-floor time. An actual record of the time required to machine rolls is shown. Comparable savings in time can be anticipated on other work.



SHIPBOARD MACHINING SAVES $50,000: Badly scored journals of the 22-ton main propulsion bull gear of the Moore-McCormack Lines Mormacwave necessitated laying up for machining. Instead of removing the 14-ft gear, which would have meant prior removal of piping, ladders, grating and machinery, it was decided by the General Electric field engineer and service ship, co-operating with Todd Shipyards, to do the work in the ship while in drydock. In the operation, two sections of the line shaft were moved back to provide room at the end of the bull gear. Then by constructing a jig of 2-in. welded steel plates, as shown here, and installing a large electric motor for turning the gear at machining speed, the job was completed in 3 weeks, enabling the owner to save an estimated $50,000 and the ship to sail ahead of schedule. According to GE, machining was so accurate that position of the shaft in reference to the pitch line was unchanged and a zero tolerance maintained

By FRANK C. WIER
Superintendent of Labor and Yards
Timken Roller Bearing Co.
Canton, O.

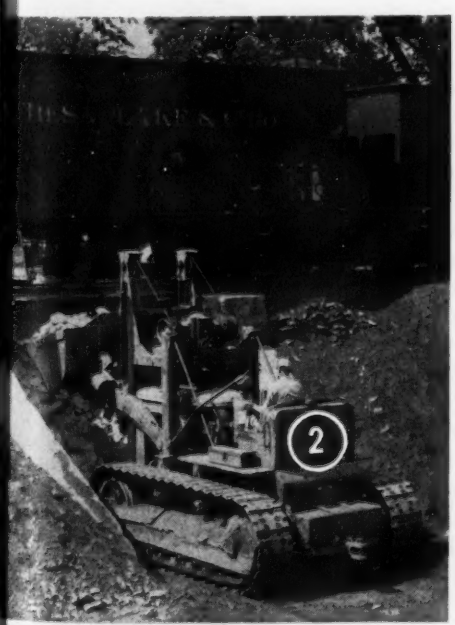
Raw Materials Handling in the

Steelworks Storage Yard

Cars are ordered to storage in sequence to avoid congesting functions of yard equipment. Bundling scrap tubes facilitates unloading by magnet. Locating shear above ground level minimizes locomotive crane service. Nonmetallic scrap handled in skips salvaged from annealing box covers

HANDLING storage items in large steel mill units is usually an engineering problem solved by permanent installations for each commodity, such as conveyor belts, bins, and ore bridges. They are successful in providing low cost, dependable service.

Smaller steel mill units have an equal number of commodities but do not have quantities which justify major installations for each. In fact, alloy steel producing mills have not only a larger number of items but in addition also have an exacting scrap segregation and classification program. These conditions require a storage yard layout providing flexible handling facilities and accurate inventory controls. A yard of this type is located at the Gambrinus plant of the Timken Roller Bearing Co., Canton, O. and serves both the Canton and Gambrinus plants of the Steel and Tube Division.



Because of production demands brought about by war conditions, it was impossible to provide additional building space necessary to handle excess raw and semifinished materials generated by peak production.

Our manner of satisfying this condition was to move outside all such materials that would stand weather conditions and to draw into one storage yard the excess of all producing departments, placing the responsibility of handling, storing, and reloading these materials under the direction of one materials handling unit. This necessitated close co-operation between storage yard and the operational units which it serves. Although the yard itself is served by mobile equipment, it has been found to be more efficient to bring the material to the yard than to send the mobile units to various working places throughout the plant because mobile lifting equipment is idle when moving. No operation is delayed by moving excess material. Increase in producing department efficiency, brought about by orderly, uncrowded, departmental conditions more than pays for any additional transportation and handling required.

Fig. 1—Truck used solely for hauling oxygen tanks to cutting station

Fig. 2—Bulk material is unloaded into track bin and handled by tractor bucket

Delivery to the storage yard is made by the plant railroad system. All inbound cars are accumulated in the classification yard. While there the scrap, or other material, is inspected, samples taken and classification made by the scrap inspector. All questions relative to quality, size, alloy content, or usability of incoming material are resolved before cars are consigned to the storage yard. Any doubtful material is accepted or rejected by the melting superintendent and purchasing department. After proper clearance is made car numbers and a description of the contents are furnished to the storage yard foreman by the scrap inspector. The storage yard foreman orders the cars to the storage yard in the sequence in which he is best able to handle them. No cars are delivered to the storage yard until they are requested. This is most important, since any other method would completely upset and congest the functions of the storage yard equipment.

In redesigning the yard it was decided to use a layout of multiple,

NUMBER 10 IN A SERIES OUTLINING
McKEE SERVICES TO THE IRON AND STEEL
INDUSTRY IN RECENT YEARS

SUMMARY

ESTABLISHED in 1905, Arthur G. McKee & Company's experience covers more than four decades of design and construction of the Iron and Steel Industry's production facilities from raw material to finished steel.

The following facts and figures briefly summarize the major iron and steel plant engineering activities of the McKee organization during the past fifteen years.

BLAST FURNACES

In the 10 years between 1936 and 1947 McKee designed and constructed 26 Blast Furnaces. More than half of these included stoves, cast houses, stock houses and gas cleaning equipment.

The 26 furnaces increased the industry's capacity by more than 7½ million net tons annually.

The total erected value of these projects exceeds 100 million dollars.

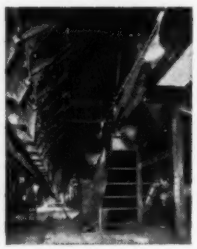
McKee work in process in 1948 includes 5 blast furnaces in the United States and 4 in England. 3 of the domestic furnaces, which will be in operation by early summer, have 28-foot hearth diameters.

HOT BLAST STOVES

Since 1935 the McKee organization has designed and constructed 118 hot-blast stoves.

The largest and most modern of these stoves have 28-foot inside diameters and a height of 133 feet, 6 inches. Each stove has a heating surface of 290,295 square feet.

STOCK HOUSES

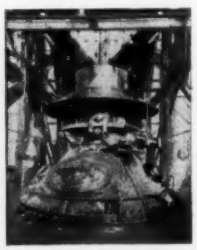


33 blast furnaces have been equipped with McKee Stock Houses in recent years.

Incorporating the most modern methods of automatic coke-charging, up-to-date features of design and latest equipment, these stock houses provide maximum operating efficiency.

BLAST-FURNACE DISTRIBUTORS

McKee has furnished more than 390 revolving distributors for blast furnaces in the United States and other countries. Mechanical dependability and rugged design have made them standard equipment throughout the United States and the British Empire.



A new type McKee distributor of greater capacity and more massive construction is meeting the requirements of the new 28-foot-hearth-diameter furnaces and older furnaces operating at high top pressures. Details are available upon request.

McKEE

DESIGN, ENGINEERING AND CONSTRUCTION

OPEN HEARTH PLANTS

McKee Open Hearth engineering included foreign and domestic contracts ranging from supervision of rebuilding to design, engineering and construction of complete plants ready for operation. Total annual capacity of the 25 units involved is over 2 million tons.

FACILITIES FOR TREATING RAW MATERIALS

Contracts in this classification included design and construction of plants for concentrating, sizing, blending and the agglomerization of iron ores.

The bedding system for accurate blending of iron ores was initiated by McKee.

Facilities built by Arthur G. McKee & Company for the beneficiation of specific ore deposits in Europe are the most complete and among the largest ore treating plants in the world.

POWER HOUSES

Recent McKee activities include design and construction of 18 power houses. More than half are in operation—the balance being in various stages of completion.

These power houses were designed to operate turbo blowers for blast furnaces, to generate operating power, to provide process steam for petroleum refining and miscellaneous industries and for general steam purposes.

Combined capacity of the 18 plants is over 5½ million pounds per hour of steam generated.

SPECIAL SERVICES

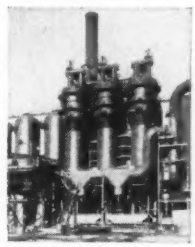
In recent years McKee organization has supplied special services on numerous individual problems involving remodeling and alteration of existing facilities to accommodate changes in operating practice, to reduce operating cost, or to increase production.

ROLLING MILL PLANTS

Contracts executed include design and construction of Blooming Mills, Plate Mills, Billet Mills, Rail and Structural Mills, Merchant Mills, Strip Mills, Cold Mills, and Tin Mills.

Typical examples of outstanding McKee design are two foreign projects, one incorporating 10 mills, the other 6 mills, a 112″—3-high and a 120″—4-high plate mill recently completed in this country.

REPLACEMENT, MODERNIZATION AND REHABILITATION



Aside from major projects McKee has undertaken separate contracts totalling over 20 million dollars for blast-furnace and stove relining, modernization of existing units, repairs of all kinds, steel mill foundations, miscellaneous steel plant buildings and structural work, secondary centrifugal dust catchers, stoves, thickeners, sludge handling, fine gas cleaning and distribution equipment.

ANALYSIS AND CONSULTATION

Practically all of the larger American iron and steel producing companies have repeatedly used McKee consulting services.

McKee clients also include the governments of the United States, Canada, Brazil and China as well as many private companies in these and other foreign countries.

McKee maintains a large staff of qualified consultants for the study and analysis of markets, quality of steel needed, nature of raw materials available and of beneficiation required, and for the adaptation of equipment and processing procedures best suited for meeting these conditions.

The volume of engineering and construction entrusted to this organization is an indication of the confidence which has been earned by McKee in four decades of service to the Iron and Steel Industry.

ARTHUR G. McKEE & COMPANY

Engineers and Contractors • Established 1905

2300 Chester Avenue • Cleveland, Ohio • 30 Rockefeller Plaza • New York, N. Y.

The Iron & Steel Division of Arthur G. McKee & Company is associated with, and identified in England as, "McKee Iron & Steel Division of HEAD, WRIGHTSON & CO., LTD."

FOR THE IRON AND STEEL AND PETROLEUM REFINING INDUSTRIES

UNDIVIDED RESPONSIBILITY IN ONE ORGANIZATION

single tracks connected where possible at both ends. Although a double track system is more efficient in some cases for locomotive crane use, we could not justify the track expense. Movement to another part of the yard is usually necessary after loading or unloading one or two cars at a given spot.

Within the storage yard, all car shifting is done by locomotive cranes. Two diesel-driven units of 25 tons capacity form the backbone of the handling equipment; a crawler-type crane is used as a standby unit or in addition as the amount of work warrants. All three cranes are magnet equipped, powered by separate gasoline-driven generator units which are interchangeable to any crane. Cable and chain slings are used for unloading bales of tubes and bars. Clam shell buckets are available but are seldom used. A heavy crawler-type tractor equipped with a front end bucket of 2 or 4 cubic yard capacity does the work formerly done with clam shell buckets.

Yard supervision is as follows:

1. General foreman who works under the direction of the superintendent of labor and yards.

2. Turn foreman who is in direct charge of each turn. At the end of his turn he leaves the incoming turn foreman a complete written lineup of all work ahead of the yard at that time. Sequence of the work as directed by the general foreman is indicated in the lineup.

3. Ground man for each crane furnishes the storage yard office at the end of each turn a written report of work done by his crane. Office clerks work from these reports to keep inventory up-to-date each day.

Weights come from our railroad yard office. All cars, including intermill cars are weighed in and out of the storage yard.

Maintenance of equipment is supervised by a head mechanic. He has a helper on each turn. All repairs are made at the storage yard with assistance from other departments called in as required. All units are lubricated by the operator at the start of each turn.

Bulk materials: Iron ore, flux stone, fluor spar, coke breeze, raw dolomite and buckwheat coal are grouped together in a part of the yard created for this purpose.

Scrap: Various forms occupy the greatest yard area and also requires most of the yard work. A preparation of certain forms of our own processing scrap is carried on here.

Semifinished: Blooms with a few ingots, and billets are given another yard section in order to facilitate locating heats for reloading.

Tubes and bars: These are handled by a different method than other semifinished steel so they are grouped together in their own yard section.

Spare parts, idle machinery: These could be dispensed with entirely if left to the yard men but not from the viewpoint of the various maintenance departments. Both sides of one track for a distance of 400 feet are devoted to this storage.

Bulk materials are unloaded as shown in Fig. 2. Sometime ago iron ore to be stocked at the yard, arrived in gondola cars. A locomotive crane and clam shell bucket were used for this unloading. This type of car caused considerable difficulty as ore routed directly to stock house had to be shipped in cross-bottom hopper cars. It was difficult to schedule the arrival in our plant of the right kind of car equipment to suit the need of the moment. As a clam sheel bucket can only work on the top of a pile of frozen ore a troublesome condition arose each winter. Cold weather loading was slow and costly. The opening made one day was frozen hard again a few days later. These difficulties caused us to seek a method whereby cross-bottom hopper cars could be used at both places and we could reduce the bucket abuse caused by the frost.

Iron ore is stocked by a heavy crawler-type tractor equipped with a front-end bucket. A section of track elevated on an earth fill at a 3 per cent grade levels off at 11 feet above the ground for a distance that will hold five cars. Under the car nearest the grade is a concrete pit 12 feet wide. Bulk material dumped from cross-bottom hopper cars into this one pit is picked up by the bucket on the front of the tractor and carried to its respective pile. The setup works as well for any bulk material that can be stored outside. There is no trackage limit to the amount of material that can be stored

Fig. 3—Annealing box covers serve as skids for nonmetallic scrap

Fig. 4—Scrap tubes for alloy types are assorted on separating tables

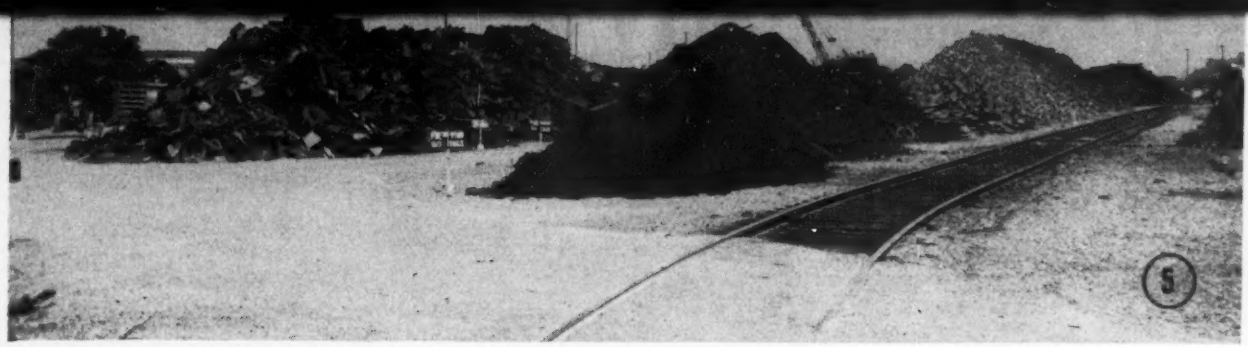


Fig. 5—Each pile in this yard is given a 3-digit number for identification and inventory purposes

by this method. A 2 cubic yard bucket is used for iron ore, fluor spar, flux stone. Lighter materials such as coal and coke are handled with a 4 cubic yard bucket.

Reloading is accomplished by a low ramp at an adjacent track, the ramp being just high enough to give the tractor bucket sufficient clearance to dump into a hopper car. Frozen ore is not a great problem to load with this equipment. When the crust of frost is broken in one place the forward power of the tractor plus the lift of the bucket as applied from below is much more effective than working from the top of the pile with a clam shell bucket.

This tractor can load scrap from stock piles into gondola cars in less time than a locomotive crane with a magnet but it is not a recommended practice. To avoid loading slag or dirt a layer of scrap must be left to be cleaned up later. We use it for this work on an emergency breakdown basis only. By the same token some part of each pile of bulk material is accessible to a track so that in case of a tractor breakdown the material can be loaded by clam shell bucket with a locomotive crane for the period of the emergency.

The purpose of this bulk material yard as related to iron ore is to stock enough during the lake season to last through the winter until the boats resume in the spring. The stock of other materials is calculated to take care of irregularities in delivery only. The regular flow is directed to the melting department. The storage yard takes the overage or meets the shortage as occasion demands. The use of the tractor bucket for this work is irregular. Spare time is used stocking coal at the boiler house and doing many and various digging and earth moving jobs about the plant.

Fig. 4 illustrates the first step in scrap preparation — the sorting of scrap tubes for alloy types. Scrapping of semifinished tubing occurs during various operations of finishing and in several different departments. A tube here and one there from many orders of varying types of steel dropped into the same scrap buck presents a hodge podge of scrap types. Over the years this presented a problem in type segregation. Upon completion of a modernized storage yard the entire problem, as well as the scrap tubes of many colors, were sent there. It was soon found that if the producer of the scrap would properly and securely wire this material into tight bundles they could be unloaded from the cars by magnet in short time. The first cars, loaded with the idea of merely getting rid of the stuff took several crane hours to unload. When the scrap comes in a properly bundled condition 20 minutes is usually enough time for unloading it.

Separating Table for Tubing

The separating table with divisions for each of ten kinds of alloy scrap is purely the child of necessity. The scrap tubes came too fast to allow for proper engineering design as the table plainly shows. It is built almost entirely of scrap rail. A full carload of tubing can be placed on the table at one time. This capacity liberates the attending crane for other work about half the time the table is in use. As the bales of separated scrap tubing are taken from bucks of the table they are stocked ahead of the scrap shears in piles according to type of steel.

Enough of one type of tube scrap is accumulated ahead of the shears to provide work for several turns. In this fashion a minimum amount of crane service is required in front of the shears in loading the prepared material. In a run of this kind of scrap, tubes of all sizes are stocked on the shear table which holds about 50 tons. The shear, being a closed type, in which the material is fed endwise by rolls, will take up to a 5-inch tube. All tubes larger than that are thrown out by a sloping roller table behind the shear feed rolls. This results in a stock of large tubes over 5 inches diameter, all of the same scrap type, being accumulated during the run. Due to their large size they handle well with a magnet in loose form. At the end of the run these large tubes are returned to the shear feed table. A short top blade is installed in the shear. Although the blades will not close on the down stroke the shearing action is satisfactory due again to the large size of the tube. In this manner all tubes up to 7 inches are sheared. Again, all oversize tubes are thrown out the back on the sloping roller table to be burned to length. By using a gage the shear is allowed to remain in gear all the time thus increasing production greatly over the regular method of tripping the foot pedal for each cut. The gage is set for pieces 30 inches long. This makes scrap that will handle well and can be charged into any size furnace that is desired.

All purchased rail scrap comes to the storage yard in unprepared form; that is, in long lengths. It also is cut to 30-inch lengths on the same shear. A short top blade is used for all rail scrap so that anything up to 7 inches is sheared without any sorting for size. Rail is loaded on the shear table directly from the inbound cars without intermediate handling. The table will hold a carload at a time. The height of the shear being 12 feet from the ground a carload or more of any material can be cut without requiring the use of a locomotive crane to take away the cut material.

A yard layout, which provides road as well as track access to all storage areas, lends itself to use a 1-ton truck for hauling tanks, as shown in Fig. 1. These tanks are not removed from the truck during the time they are in use. A crew of three burner men load the truck at the storeroom and proceed to work any place in the yard. Hose and torches are also carried on the truck being changed from one tank to another until the entire load of tanks is exhausted. Empties are then returned to the storeroom and a load of full tanks taken on. This truck is used for no other purpose.

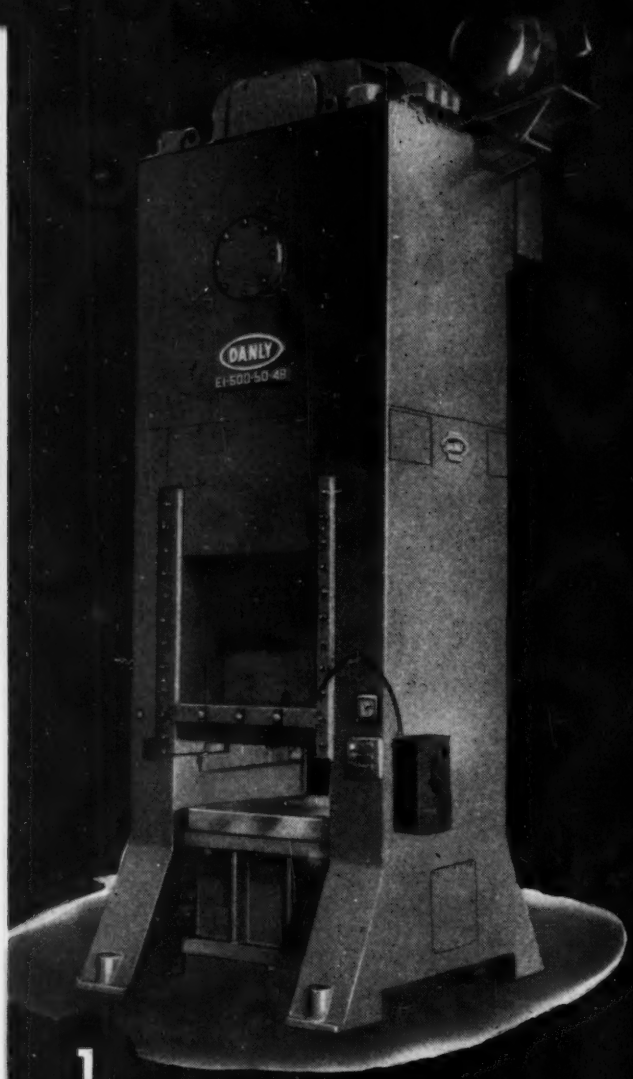
Fig. 3 illustrates the method of

DANLY STRAIGHT SI

THE RUGGED strength and precision construction of Danly Presses is a guarantee of greater production and continuing accuracy of stampings.

A circulating, filtered lubrication system keeps working parts under direct controlled lubrication.

The Danly Air Friction clutch is so designed that most of the moving parts rotate with the flywheel at all times, materially reducing the energy required for starting and stopping. Fully ventilated for cool operation, this clutch has, in its design, the charac-



1

2

1 POINT PRESSES

The 500 ton Eccentric Gear Press (*above*) was designed for a job which required a comparatively high tonnage exerted over a small area.

The heavy construction and massive rigidity of this press insure the accuracy of stamped parts, the safety of the dies. Danly single point presses are standard from 100 to 600 tons capacity.

2 POINT PRESSES

Typical of the entire line of Eccentric Gear Presses, the cleanly designed two point 400 ton press (*center*) is suitable for right to left or front to back feeding. Absence of overhanging machinery leaves plenty of headroom for feeding and scrap removal. 2 point presses are standard from 100 to 1200 tons capacity.

4 POINT PRESSES

The 1000 ton 4 point press (*right*) has a slide connection or suspension point at each corner of the slide. This method of suspension keeps the slide and bed in parallel even when off center dies are consistently used. Danly 4 point presses are standard from 100 to 2000 tons capacity.

Write for circular on Danly Eccentric Gear Straight-Side Presses

DANLY MACHINE SPECIALTIES, INC.,

IT SIDE PRESSES HAVE . . .

teristics that make for long life and low maintenance.

Notice the rugged massiveness of the presses shown below—the modern enclosed construction that increases safety and operator acceptance.

Men who work with presses—supervisors, maintenance men, and operators alike—will find in the Danly Press, the features they want for better, faster press operation—the features that result in greater volume production of more accurate stampings at lower unit cost!

1 Sound, Clean Welding
2 Stress Relieved Weldments
3 Precision Machining
4 Rigid Enclosed Construction
5 Accurate Alignment
6 Circulating Filtered Lubrication System
7 Disc-Type Clutch and Drum Brake
8 Electrical Controlling

THESE FEATURES GIVE YOU—

1 Accurate Stampings
2 Trouble-free Operation
3 Less Tool Wear
4 Ease of Operation
5 Safety
6 Accessibility
7 Simplified Maintenance

Result—

Greater volume production of more accurate stampings at *lower unit cost.*

2100 SOUTH 52ND AVENUE • CHICAGO 50, ILLINOIS

handling nonmagnetic scrap. The availability of usable skips salvaged from scrap annealing covers, reduces the difficulties of this handling to a minimum. Two of these are burned from each scrap hood before the hood is reduced to chargeable size. Hard, heavy usage does not promote a long life but is sufficiently long to keep enough empty skips to receive the nonmagnetic scrap as it is generated in the producing departments. Once in a skip the scrap is not removed during the handling and storing cycle. When the scrap is transferred to charging boxes in the melting department the empty skips are returned to the storage yard. From there they are sent out to the producing points as required.

Electric furnace melting of alloy steel requires large quantities of low-phos scrap. This usually is 1 foot square or less and thin. Outside storage for this grade is satisfactory, as only the exposed surface of a pile is slightly affected by the weather.

Formerly scrap was stored in large piles so that the greatest amount could be positioned along a minimum footage of railroad track. Some track extensions were made from time to time until a storage area was formed. Scrap was purchased with the idea of feeding directly to the stock house, and furnaces. If market conditions were favorable, an excess was placed in storage. Scrap was accumulated until it was felt that the melting operation was adequately supplied with raw materials. As scrap was drawn from storage for melting, many mixed types were found in these large piles. Melting troubles followed. High-grade alloy steels cannot be melted economically from mixed or unknown scrap. It was further found that adding and taking from the same large pile of scrap made it difficult to maintain accurate inventory records, resulting in tonnage variations when any large pile was finally exhausted.

The first and most important step in seeking a remedy for these conditions was to attain a conviction in the minds of men who do the handling that the material in question has value, is of importance, and is not just so much junk. Proper handling from a personnel angle is achieved only where physical conditions allow a good job to be done.

Yard modernization which followed was instituted principally for scrap storage purposes. Other items were added after it became evident that an adequate yard setup made economic handling possible.

Size of Scrap Pile Limited

In the new yard, scrap piles in general are limited to 1000 tons. When this tonnage is reached a new pile is started. If the flow of material is reversed and loading is started from a pile no more is added to that pile. With the more active types of scrap there is usually a pile being made and another which is being depleted, both in existence at the same time. This small pile method eliminates the necessity for year-end inventory adjustments.

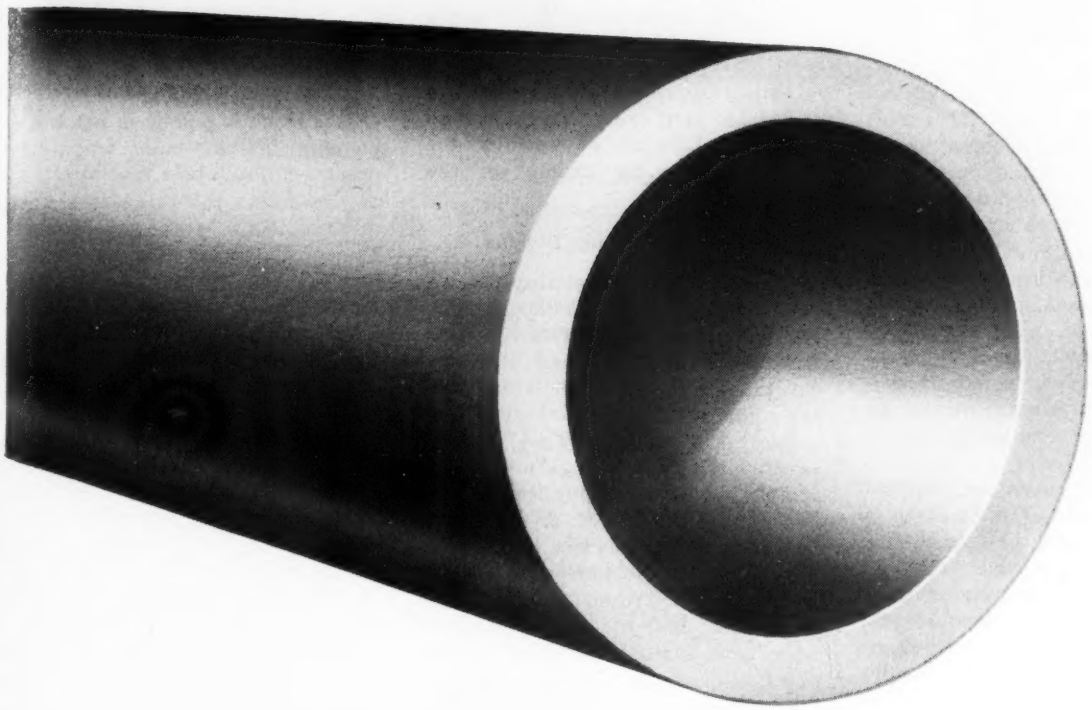
Any irregularity in weight is exposed and adjusted as each pile is exhausted. This method also permits classification on a physical basis in addition to alloy type segregation. If, through an error, a mixup should occur only a relatively small amount of scrap is contaminated with another type. The comparatively rapid pile movement allows maximum flexibility in yard capacity, since one type of scrap often diminishes as another increases. No effort is made to pile the same type in the same spot; instead an absolute cleanup is made when a pile is depleted which necessitates a 4 to 6-inch layer of crushed slag over the entire yard area. Remaining loose and being porous, no water can stand in contact with the stored material. Scrap or any other material does not freeze fast in the winter. No trouble is experienced with scrap sinking into soft wet earth and even small pieces of scrap clean up readily with the use of a magnet.

Scrap emanates from two general sources; purchased and that generated by processing. Both are routed to the storage yard. The intermill scrap is loaded into company-owned cars with a billing attached to the car as well as a copy sent to the storage yard. Enough pieces in each car are painted with a designating color to identify the type of scrap. Many cars contain two or three types of scrap. These are separated by partitions constructed of lumber. The plant railroad system moves the car to the Canton or Gambrinus railroad yard, as the case may be. The yardmaster notifies the storage yard of the presence of the car. After the scrap inspector has approved the contents for application the storage yard orders the car to move, either directly to the stockhouse for melting as a part of their daily order, or to the storage yard for unloading. Purchased scrap is handled in much the same manner. Although all scrap is directed to the storage yard a great majority of it is intercepted enroute and sent directly to the melting department without reaching the storage yard.

By having all scrap directed to the storage yard the general foreman there is able at all times to form an appraisal of the volume and type of work ahead. This is essential as the arrival of purchased scrap and even intermill material is subject to wide variation and the variation must be absorbed by the storage yard.

The melting department each day places an order with the storage yard for the amount of the various kinds of scrap necessary as indicated by current melting. This order is filled during the ensuing 24 hour period. It is moved as loaded to a yard which is adjacent to the melt shop. Figuring a full stockhouse plus cars enroute to fill their daily order, the melting department has ahead of

Fig. 6—Blooms are classified for chemical and physical properties before storing



You'll find extra profits in this hole

IF you make a hollow cylindrical or ring-shaped part, you're ahead by using Timken seamless tubing.

Drilling of the center hole is eliminated. There's less stock to machine. You save on scrap loss.

Timken seamless tubing can give your product added strength—greater uniformity. The piercing process by which Timken tubing is made is basically a forging operation. The metal is thoroughly hot-worked from the inside, the outside, and throughout the entire cross section. This gives Timken tubing a uniform spiral grain flow which makes products stronger, and a refined grain structure which brings out the best in the quality of the steel.

And because of the Timken Company's rigid quality control from melt shop through final inspection, this fine forged quality is uniform from one end of the tube to the other—from tube to tube—and from heat to heat. So you can always count on uniform response to your machining and heat treating operations.

An on-the-job analysis by our Technical Staff will show you how Timken seamless tubing can cut your production costs, improve the quality of your product, . . . or *both.* No obligation. Just write The Timken Roller Bearing Company, Steel & Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

Fine Alloy

STEEL

and Seamless Tubes

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing

it at all times enough scrap to last for 48 hours. By this method the melting department has only to indicate their daily need and is relieved of doing anything about the excess or shortage as the case may be.

This handling method requires a high degree of co-operation by all parties. The increased amount of detailed communication required is saved many times over by the decrease in physical handling.

Scrap stored in the yard shown in Fig. 5, is divided into 85 chemical or physical types which are carried in 14 general classifications. An average of 105 separate piles are maintained.

For yard and inventory identification purposes each pile of scrap is given a number of three digits. This indicates the general classification, such as heavy melt, purchased alloy, etc., as well as the individual pile number. Adjacent to each pile there is placed a sign which gives the pile number, alloy type number and inventory name of the material contained in each. These are used to identify the material for the yard men when loading, as well as for inventory purposes.

Storage capacity of the yard using the piling system described, is less per foot of track and less per acre of land than if large nonaccessible piles were used. Experience has indicated, however, that the merits of knowing exactly how much scrap is available and that it is all usable, as it is intended to be used, more than pays for the additional track and land required.

A physical inventory of scrap in the storage yard is taken on the first of each month and any corrections are made at that time. An inventory report made by the storage yard office is furnished to interested parties. A daily report of loading and unloading in the yard is forwarded to the melting superintendent, the cost department, and the purchasing department. This report serves as a valuable aid in the control of scrap supply as it provides the scrap buyer with an up-to-date inventory at all times.

Scheduling by the production department of shipments of blooms to be moved to the storage yard is often necessary to avoid storage yard congestion, but more important to minimize the movement of material and at the same time remove excess stock from the bloom or billet yards in our Canton plant. This excess varies widely in amount from time to time. A much wider scope in the scheduling of melting and rolling is afforded by having ample room to absorb excess bloom and billet inventory. Scheduling for rolling of steel placed in the storage yard is no different than that retained in the bloom yard except that 24 hours additional time is allowed by the schedule clerk for loading at the storage yard.

Method of Storing Blooms

An easy method of storing blooms, when yard room is available, is just one heat high though this condition seldom prevails. To avoid "digging" out the bottom heat when the piles are much higher, the following procedure has been evolved. Heats selected for yard storage are classified for chemical and physical properties before being sent to this yard instead of after they are piled there. The production department advises the storage yard foreman which heats are similar and they are placed on piles accordingly. As soon as the piling is done the yard clerk notifies the production department schedule clerk as to the piling sequence. This information being applied to his heat cards indicates which heat is on top of a given pile. Since all multiple heat piles are the same specification from top to bottom the top heat is always scheduled first.

Due to the many types of alloy steel the co-operation necessary to effect this program is considerable, but once established it has worked smoothly. It is found much faster and more economical to move words and records than to move heats of steel.

Piercing and bar mills are scheduled to attain maximum production under current orders. To satisfy customer requirements it is often necessary to finish the material in smaller quantities than those which are produced on the mills. The resulting temporary excess stock is more than can be accommodated in the finishing departments. To unload all stock and reload the excess for outside storage is more than overhead cranes can handle while serving the finishing machines. The solution of the problem was found in taking all carloads of this tube and bar stock to the storage yard for unloading. It is then sent to the finishing department as their schedule requires. A small portion of the stock is moved in as it is unloaded. The major portion remains in storage from one to 10 days. The movement is timed closely. The stock is moved into the finishing department the same day schedules are issued. This method of handling provides a flow of stock which accommodates maximum finishing department production. This is not a rehandling operation. It is more a change of transport vehicle, with part of the material delayed to suit the conveniences of the receiver.

This stock is put up in bales at the piercing or bar mills where it is produced. Each bale has an attached tag recording the bale number, heat number, alloy type, and customer's name. The bales are unloaded for cars at the storage yard by locomotive or crawler crane. They are placed in lifts for straddle truck handling as they are unloaded on the ground. To suit the coming operation the number of bales in each straddle truck lift, is indicated by the production department before unloading. The movement into the finishing department by straddle truck is desirable because no loading or unloading equipment is required. This is done by the straddle truck mechanism once the lift is set up.

Although spare parts and idle machinery are placed in a part of the main yard the responsibility for the contents belongs to the superintendent of maintenance. The yard organization furnishes lifting power as required. Departments planning to load equipment for this type of storage contact the storage yard foreman before loading. This allows a loading delay if the yard is crowded with other uncontrollable work and prevents congestion.

Twice a year a yard check is made for scrap or obsolete parts. These are removed, broken or burned and placed as prepared scrap by the yard men, after they are marked by the maintenance supervisors. This scrapping is essential as it is easy to send it to the "dump" and forget about it. For this same reason a definite limit is placed on the extent of this part of the yard.

Material handling methods developed through the use of this storage yard prove certain theories that have been long entertained, namely:

1. Elimination of material congestion and confusion resulting from rehandling in the various producing departments warrants whatever outside handling, detail work, communications and attendant transportation that are required to establish the desired flow of materials through the plant.
2. Departmental excess material problems are solved to the best advantage by a storage yard whose sole purpose is to receive, store, and reload the excess materials for all departments.
3. Pride of workmanship and good housekeeping can and should be developed in handling common and less valuable materials to the same degree as that expected in more costly work.

—o—

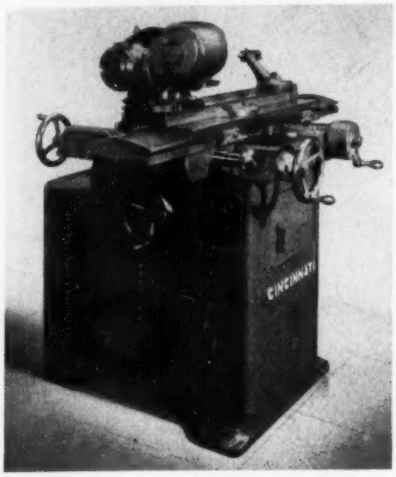
Gas fired furnaces for annealing, carburizing, drawing, hardening, spheroidizing, malleablizing, normalizing and dry cyaniding were recently announced by Westinghouse Electric Corp., Pittsburgh. These supplement the electrically-heated furnace line.

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 124

1. Cutter, Tool Grinder

Grinding wheel spindle bearings of improved No. 2 cutter and tool grinder, built by Cincinnati Milling Machine Co., Cincinnati 9, O., are the preloaded precision antifriction type, packed in grease for lifetime lubrication. Dual hand table traverse knobs, traditionally located at rear of machine, are duplicated at front, giving operator control at every possble operating position.



Vertical adjustment of grinding wheel head is increased 3 inches to 10-1/2 inches. Electrical controls are built in, recessed in a compartment at front of machine. Daily lubricating requirements have been reduced. Nine separate lubrication points are serviced by a built-in reservoir and plunger pump. Attachments for face mill grinding, long reamer grinding, spring collets, etc., are offered, along with two new attachments for wet grinding, one for cylindrical and the other for carbide grinding.

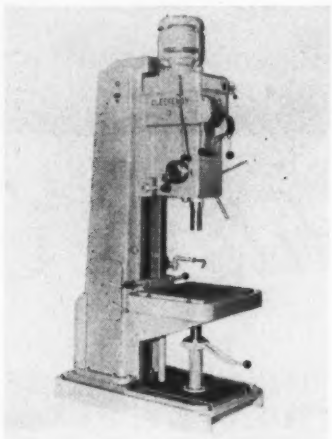
2. Bench Grinder

Designed for general purpose grinding within its rated capacity, the Reddy 6-inch utility bench grinder, manufactured by United States Electrical Tool Co., Cincinnati 14, O., has a 1/3-horsepower capacitor type ball bearing motor which is totally enclosed and has a 3450 revolutions per minute load speed. It is equipped with one coarse and one fine 6 x 3/4 x 1/2-inch abrasive wheel.

Features include tool rest which is adjustable for wheel wear, conductor rubber covered cable with one wire for grounding, rubber feet and provisions for bolting to floor. Weight of unit is 45 pounds. It can be furnished for 110 or 220 volts, 50 or 60 cycles, 1, 2 or 3 phases, alternating current.

3. Drilling Machine

Featuring a fully enclosed single unit sliding head which houses the spindle and feed mechanisms, motor and spindle speed transmission, the model 325 drilling machine, built by Cleereman Machine Tool Co., Green Bay, Wis., has single lever functional control with six geared spindle speed changes on one lever and four feed rates on another. Other features include direct action feed clutch engagement, feed depth stop and a short rigid sensitive spindle.



A manually indexed, 4-position turret feed trip can be arranged for automatic cycle control for tapping. Pick off gears for varying the feed range or providing tap leads are offered. All electrical controls are on the sliding head. Sliding head and table have manually operated elevating devices.

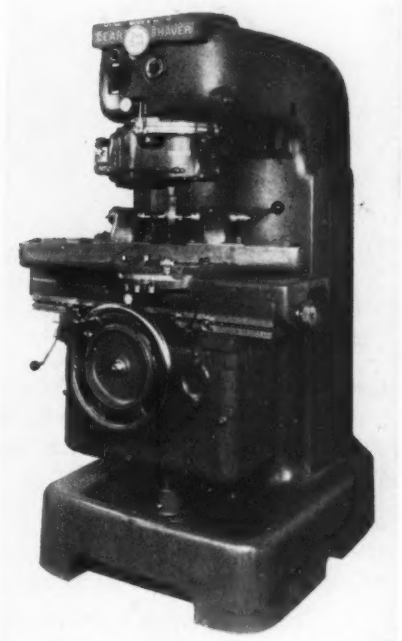
4. Speed Measurers

O. Zernickow Co., 15 Park Row, New York 7, N. Y., is marketing two improved instruments for the measuring of speed, a chronometric tachometer which shows speeds in revolutions and feet per minute and a Tachoscope revolution counter synchronized with a Swiss stop watch. Former instrument, the type A Tachoscope has a 3 seconds indicator and a range of 0 to 20,000 revolutions per minute, while its type B counterpart has a 6 second indicator and a range of from 0 to 2000 revolutions per minute. Dial reading are halved to get feet per minute readings.

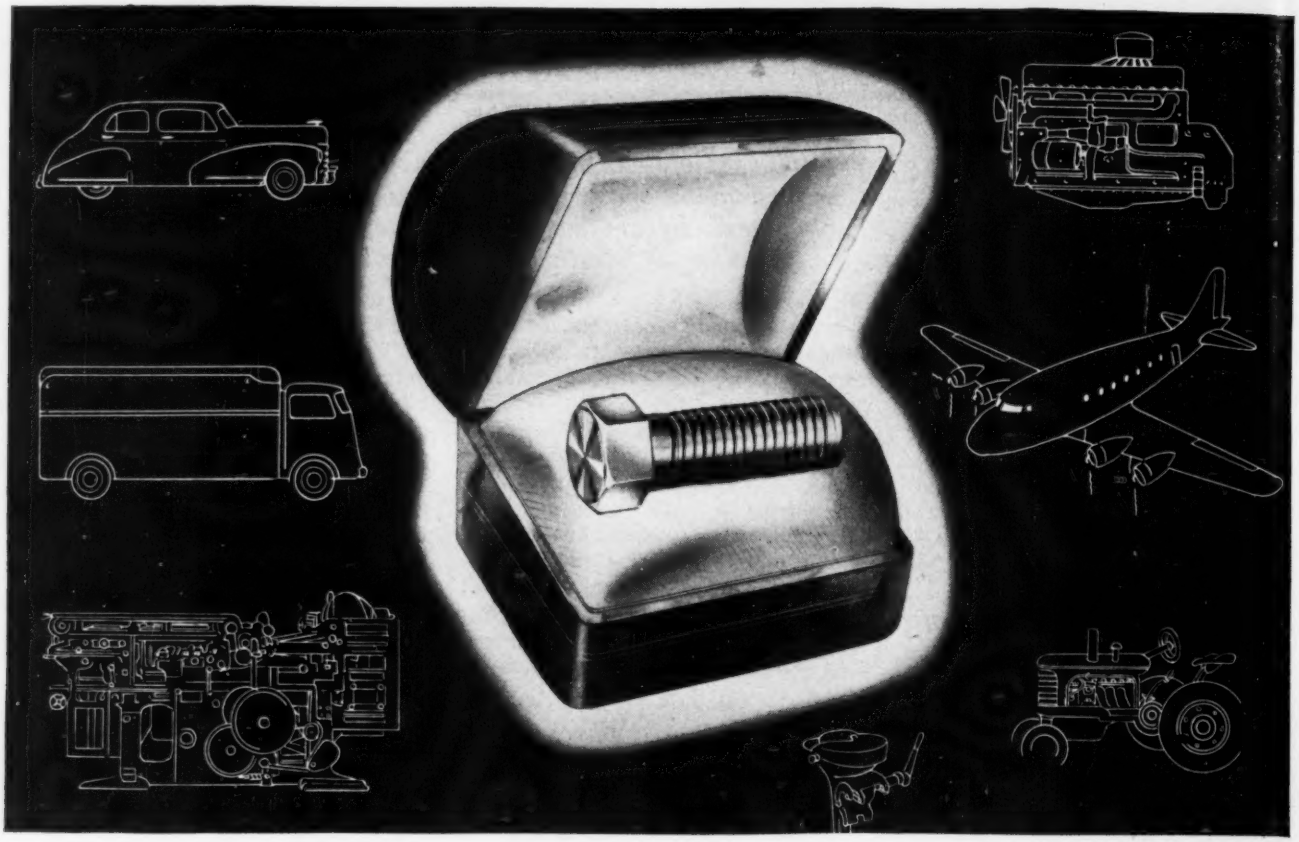
Counter synchronized with stop watch will serve as speed indicator, calibration check for tachometers and stop watch. Trigger starting and stopping mechanism controls both counter and watch simultaneously. Its range is 0 to 30,000 revolutions per minute, right or left.

5. Gear Shaving Machine

Gears may be shaved by either the diagonal or conventional method, using the Red Ring model GCV universal diagonal with crowning gear shaving machine, developed by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. Any gear being shaved conventionally can at the same time be given the elliptoid tooth form by rocking the table as it is being reciprocated. Degree of crowning and position of crown are selective.



Gears with face widths up to about 2 inches may be shaved with diagonal table traverse, where gear is automatically reciprocated at a diagonal angle to its axis, across the cutter and



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Truly a jewel in the production of quality machinery and equipment, Shinyheads are justifiably famous. Their bright, shiny heads give that final, finishing touch, that extra sales appeal.

Just look at these features:

Hexagon heads — full finished — completely machined — top and bottom . . . bearing surface washer faced.

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Threads uniform and accurate to close tolerance dimensions for perfect fit to standard gauges.

Points machine turned — flat and chamfered.

More and more buyers simply specify Shinyheads. *Justifiably famous* — Shinyheads have earned the reputation as *"America's best looking cap screw."*

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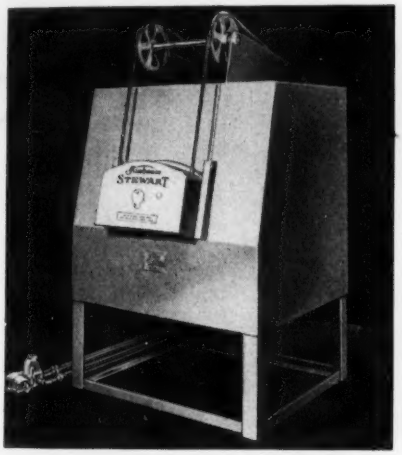
CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS • SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS

back, for a total of two strokes. Center distance between specific work gear and cutter remains constant. This method materially reduces shaving time and prolongs cutter life. Gears shaved by this method may be crowned by rocking the table with an adjustable cam. Principle of rotary crossed axes shaving is retained in the machine. A fast lock tailstock facilitates loading and unloading.

6. Preheat Furnace

General purpose heat treating and preheating of high speed steel may be performed in the new Sunbeam-Stewart electric furnace, built by Sunbeam Corp., Chicago, Ill. It has a wide operating range from 400 to 1850° F. Heating elements on four sides of chamber assure close temperature control and even heat distribution.

Rolled nickel-chrome-alloy ribbon



is formed into continuous loops supported with insulators, allowing free expansion and contraction and freedom to radiate heat. Ribbons may be replaced by removing door vestibule tiles. Seal-Tite door assures tight seal between door and furnace at all times. Made in various sizes, the furnace has a door which may be operated by a foot operated air hoist, if desired.

7. Dynamometer

Speed range of 200 to 6500 revolutions per minute is announced for the new 25 horsepower transmission and absorption dynamometer by Electro Mechanical Devices Co., 49 Selden, Detroit 1, Mich. Designated as model E, it is for testing gasoline engines, electric motors, air compressors, fluid motors, fuel pumps and gear pumps. It is a self contained unit, with motor generator set mounted and wired in base.

To use it is necessary to only connect three-phase wire and lag the unit to the floor. Switching from motoring to absorption is automatic when rheostat control increases or decreases in relation to speed of unit being tested. Torque is read in foot-pounds on scale.

8. Cylinder Head Tester

Production of 60 pieces per hour at 80 per cent efficiency is claimed for the special automotive cylinder head volume testing machine, produced by Snyder Tool & Engineering Co., 3200 East Lafayette, Detroit, Mich. Cylinder head is clamped in fixture by air operated toe clamps and by a manually positioned latch clamp. Operator opens a valve which fills the series of metering glasses along top of machine with compound treated water.

Each glass is opened and liquid allowed to pass into cylinder head combustion chamber. The liquid rising in the glass gages registers the volumetric content of each combustion chamber. Liquid is brought into chamber in such a way to displace all air. At completion of cycle, liquid is drained into a tank and

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FORMING
COINING

This 2,000-ton self-contained HYDROLECTRIC Forming Press can do a big job for Hot Die-Forging or Forming . . . and do it well, automatically. Standard equipment contains a centralized control system, fully automatic, semi-automatic or manual operation . . . just by setting the selector switch. A special die-setting control available, providing sensitive platen movement. For more details, or engineering advice, ask R. D. Wood Company, Public Ledger Building, Independence Square, Philadelphia 5, Pa.

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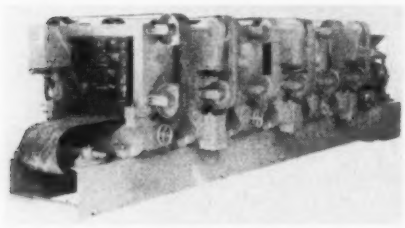
R.D. Wood Company
EST. 1803

pumped into a reservoir above the metering glasses.

9. Magnetic Separator

The high intensity cross belt magnetic separator, announced by Dings Magnetic Separator Co., Milwaukee, Wis., is intended for the concentration and purification of magnetic and



nonmagnetic materials. A few of the materials separated, some never separated magnetically before, are ilmenite, chromite, garnet, epidote and wolframite. Separator is offered with any number of cross belts, an eight belt unit, for example, being capable of concentrating eight magnetic products and one product that is nonmagnetic.

Separate concentration of materials is accomplished by varying the strength of each cross belt magnet. Three features further the high degree of selectivity: Extremely high intensity magnetic pole; hand wheel adjustment of air gap to increase or decrease concentration of flux lines at pole nose; and variable speed drive on main conveyor belt.

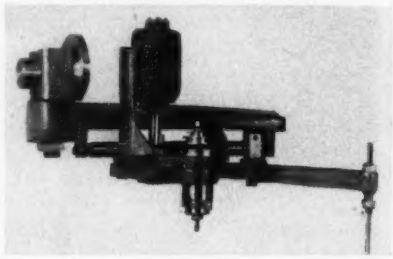
10. Special Purpose Machine

Drilling, countersinking and tapping sixty heavy duty truck rear axle housings with only one operator is possible with a special purpose machine developed by Cross Co., Detroit 7, Mich. Operator merely positions housing at loading station and presses control button. Transfer mechanism carries work to operations in sequence. Part is automatically located and clamped at each of three double end machines which drill, countersink and tap twelve holes on carrier side, twelve on cover side and three in each of two brake pads.

Drills and countersinks are hydraulically fed, and taps are lead screw fed. Whole line operates in one automatic cycle which is electrically interlocked for safety. Machines can be added, removed or shifted, and transfer mechanism altered to meet changes in product design and in sequence of operations.

11. Engraving Attachment

Two and three dimensional profiling and contour milling, as well as engraving, may be performed with the control-cut Multi-Graver attachment for any milling machine, developed by Auto Engraver Co. Inc., 1776 Broadway, New York 19, N. Y. The attachment, for the machine over-arm,



is capable of reproduction at 1:1 or at ratios of 2:1 to 4:1. At 1:1 it utilizes the feeds of the miller; the possible 12-inch area covered being governed by the miller capacity.

An area of 8 x 16 inches at 2:1 to 3 1/2 x 10 inches at 4:1 can be attained, or proportionate at intermediate ratios. Unit is made of steel

(For more information, use the card following page 124.)

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THE "built-in" goodness of Atlas Drop Forgings helps to improve machinery products in every industrial field. Our years of insistence upon knowing what goes on inside Atlas Drop Forgings while they are being made has paid off in continued and increasing patronage.
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AND MANY OTHER DIVISIONS OF INDUSTRY
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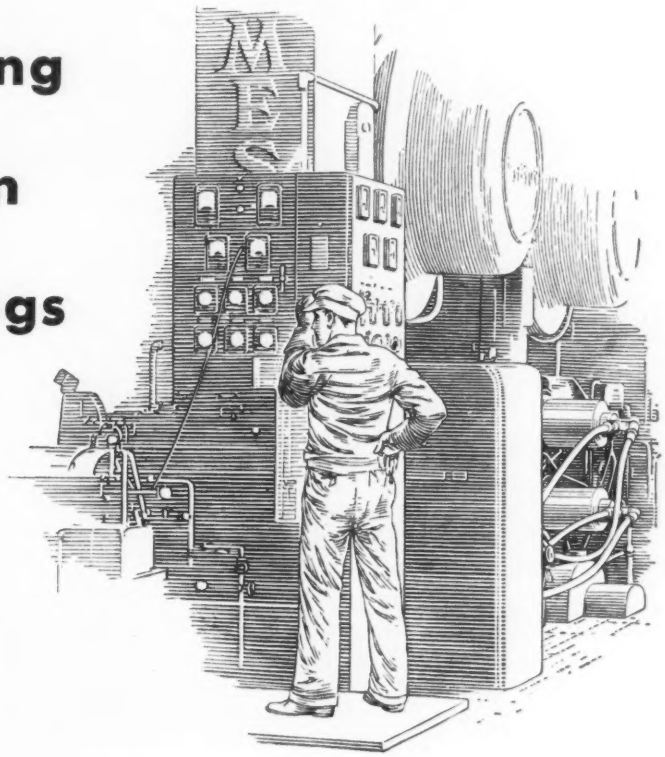
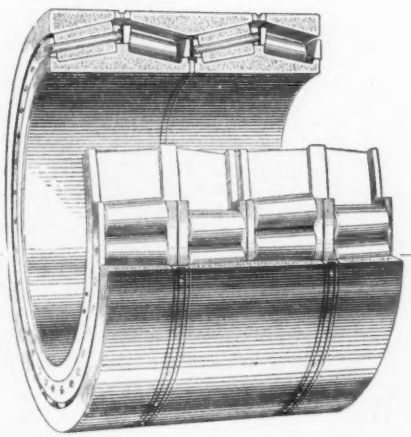
Mesta hot strip mills incorporate the many advantages of Torrington Roll Neck Bearings.

Continuous Rolling With Torrington Roll Neck Bearings





...higher load factor—an advantage possible because of proportioned design and high radial and thrust capacity of Torrington four-row Tapered Roller Bearings.

AS EACH SLAB slams through the stands, you can count on Torrington Bearings to keep the mill rolling out record tonnages. Here are the reasons why: Provision is made for greater strength in roll necks as well as in the bearings... Increased neck diameters are allowed by the minimum cross-section... Closer spacing of rollers means higher radial and thrust capacity to handle heavy shock loads. These features, together with the efficient lubrication system provided in the bearing design, assure maximum service life.

Assure yourself this kind of performance on work rolls, back-up rolls, screw downs, edgers, shears, table rolls and pinion stands by ordering Torrington Bearings for your equipment.

For follow-through service, call on the specialized skills of Torrington's engineers, who have had extensive experience in designing, building and applying anti-friction bearings in the steel industry. Call or write the nearest Torrington office.

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SPHERICAL ROLLER
TAPERED ROLLER
STRAIGHT ROLLER
NEEDLE
BALL
NEEDLE ROLLERS

For STAMINA and ABRASION RESISTANCE at LOW COST

C.M.I. Coal Dryers are Welded with GENEX and HARDEX

Structurally the cleverly designed coal dryers built by Centrifugal & Mechanical Industries of St. Louis stand up under severe impact and vibration in their work of drying more than 75 tons of coal per hour. Genex is used in the fabrication of these remarkable units because it assures welds of more than ample strength and too because among E-6012 electrodes it is outstandingly economical in operation. It is easy to handle . . . Spatter loss is low . . . and the electrode can be used at appreciably higher currents than normal *without overheating*.

Another notable feature of these C. M. I. units is the hard facing of every surface which comes in contact with coal in motion. Here because it is economical in cost and is as easy to use as a Mild Steel electrode, Hardex 60 is employed for overlaying an extremely tough abrasion resistance deposit on rotor vein guides, etc.

Among the 90 odd electrodes in the M & T line there is sure to be one or more which can bring similar advantages to your welding operations. Write for more details today.

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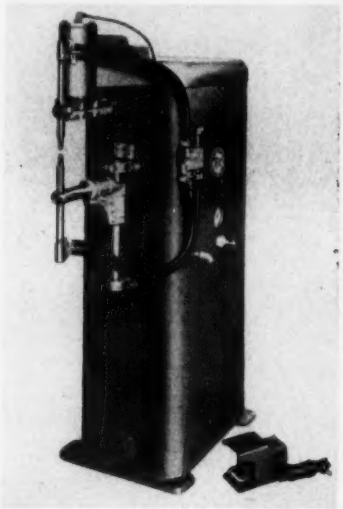
MUREX WELDING ELECTRODES
M&T ELECTRODES and GAS RODS
M&T WELDING ACCESSORIES

and heat treated aluminum alloy and is equipped with ball bearings. Spindle is ground, has a vertical feed of 12-inch, four speeds and is ball bearing equipped. Drive is by a 1/5-horsepower motor.

12. Spot Welder

Side play of head is prevented and clean uniform welds are assured by a steel guide through the cylinder wall and piston of the 15 kilovolt-ampere air operated spot welder, manufactured by Banner Products Co., 4965 North 29th St., Milwaukee, Wis. Other features include alumi-

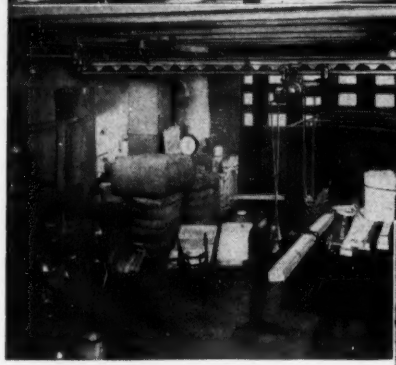


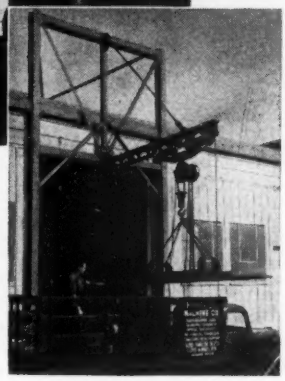
num-bronze piston with long bearing surface, three cast iron piston rings to reduce friction, castings of high conductivity-high strength copper alloy and water manifold located for parallel cooling of transformer and electrode holders.

Frame of welder is arc welded ⅜-inch boiler plate. A cast iron head houses the air cylinder. Transformer may operate on 220 or 440 volts, 60 cycles. Eight ranges of heat are provided. Throat is 12 or 18 inches and stroke is 1½-inches. Operation is by pilot operating foot switch which initiates a ¼-inch 3-way solenoid air valve. Welds may be made in 18 gage clean mild steel.

13. Sump Cleaner

Chips, grindings, cutting oil or soluble coolant are removed from machine tool sumps or scale or contamination is removed from quench and settling tanks with the redesigned sump cleaner announced by Honan-Crane Corp., 636 Wabash Ave., Lebanon, Ind. It will clean up an individual machine in 10 minutes or less. Transfer of oil or coolant from sump to tank is by vacuum, no con-





IT'S EASY TO LOAD TRUCKS with CLEVELAND TRAMRAIL

Heavy or Unwieldy Materials Quickly Loaded with Minimum Handling

Hard pushing, pulling, lifting is practically eliminated when trucks are loaded or unloaded with Cleveland Tramrail. It is simply a matter of attaching the hook or proper grab, lifting with an easily operated electric or hand-chain hoist, and conveying directly to destination without in-between handling.

Time is saved! Trucks are loaded or unloaded in a fraction of the usual time. Safety is bettered! There are far fewer accidents when overhead handling equipment is provided. More materials can be handled! With the addition of the proper Cleveland Tramrail equipment, present loading dock areas will often keep apace with greatly increased plant production. Further, the less time a truck is standing idle, while loading or unloading, the more time it can be moving with pay loads.

(Top) Unloading 2-ton packs of steel sheets with a Cleveland Tramrail Model A Chain Hoist and hand-operated sheet lifter. The loading dock rail extension is a part of an extensive plant-wide Cleveland Tramrail system.

(Above picture) One man easily loads long, heavy boxes onto the truck with this hand-propelled crane and electric hoist.

(Right) Materials are taken directly from truck to fabricating department or vice versa with this Cleveland Tramrail system. For handling small numbers of sheets the inexpensive sling-type sheet grab is satisfactory.

★

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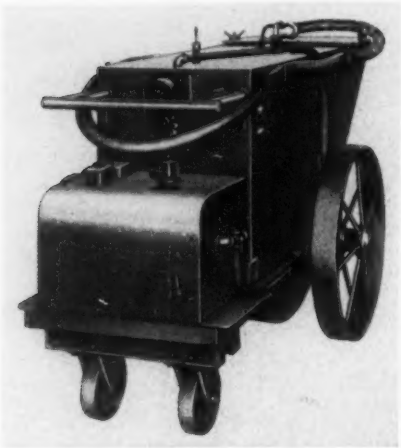
THE CLEVELAND CRANE & ENGINEERING CO.
7826 EAST 284th STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

taminated liquids passing through the pump.

A 3-way valve which instantly changes suction to pressure permits the unit to be used for dispensing clean liquids. Hermetically sealed mercury contact switch, mounted on



the sump cleaner and actuated by a float lever mechanism, automatically cuts out motor and pump units when tank is filled. Unit is mounted on large wheels and tank is balanced for easy dumping.

14. Adjustable Drillhead

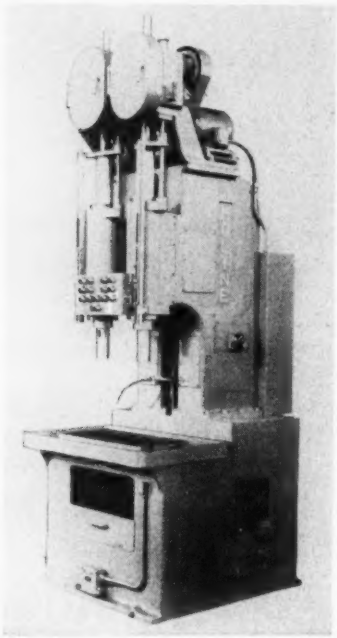
A universal joint drive model has been added to the line of adjustable multiple spindle drillheads manufactured by Thriftmaster Products Corp., Lancaster, Pa. The drillhead, full ball

bearing mounted, has a high overload capacity, made for use with power feed. It is rated at full capacity of 1/4-inch drills in steel.

Gears and spindles are of special alloy, test hardened steel. Unit is furnished with two to six spindles with a minimum center spacing of 1 1/8-inches within a 6 1/4-inch diameter circle. It is made for right hand rotation of the drill press.

15. Drilling Machine

With a spindle having the capacity to drive a 1 1/8-inch drill in mild steel, the HF148 drilling machine developed by Moline Tool Co., Moline, Ill., can be built as a single column-single spindle machine, as a two



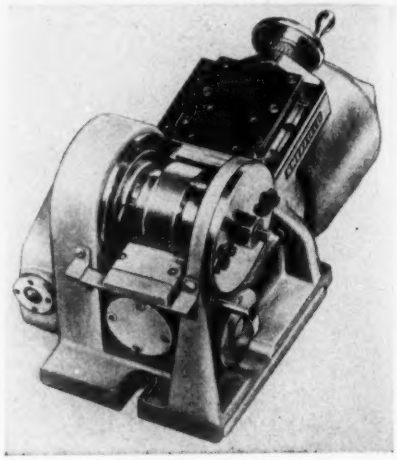
column with individual hydraulic feed to each of its two spindles (illustrated) or as a multiple column-multiple spindle machine.

Electrical control of hydraulic feed permits an independent, automatic operating cycle for each spindle which can be initiated by pushbutton or foot operated switch. Switches can be set so that either spindle will repeat the feed cycle continuously until stopped. In the two-column model, both spindles can be run in alternate, continuously repeating cycles by means of electrical interlocking.

16. Crushing Device

Sheffield Corp., Dayton 1, O., is announcing a self-turning motorized crushing device for forming cast iron crushtrue rolls and crushtruing grinding wheels. The self contained two speed unit employs a carbide tool for dressing the form of a Meehanite or other close grained cast iron roll which is then used to crush the grinding wheel—all without removing the roll.

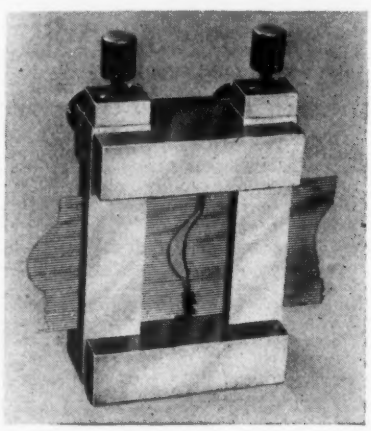
Unit is designed for mounting on the table of a wet type surface grinder with a table of 8 x 24 inches or larger. In certain cases of simple shallow profiles it may be possible to form the blank roll directly with the carbide tool. Normally the roll is rough formed on a lathe, then finish



formed on the device. As roll becomes worn from repeated grinding wheel truings, the clutch is shifted to low speed and the tool fed slowly until the original form is restored.

17. Contour Transfer Gage

Providing means for reproducing many curves which are difficult to gage directly, the contour transfer gage, designed by Thompson Products Inc., Cleveland 17, O., can be ap-



plied with equal facility and accuracy both to checking die cavity contours and production line parts. In conjunction with an optical comparator, it permits a rapid, simple setup for checking dimensions. It may be used with dial indicator or height gage.

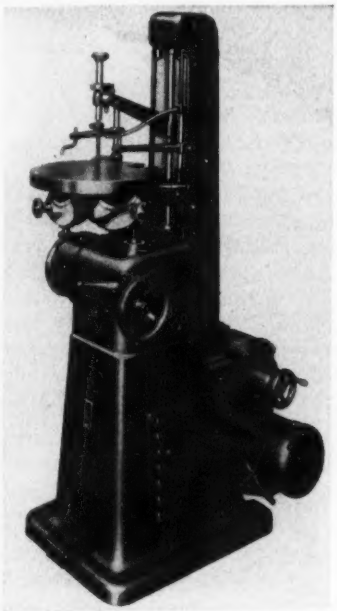
Gage may be used for such uses as measurement of turbine or compressor master blade pattern and production blade shapes in either rough semifinished or finished condition, measurement of contours of any type

(For more information, use the card following page 124.)

in die cavities, moldings, extruding and stamping dies and measurement of large radii. All pins of gage are sized within 0.0002-inch, making possible checking of contours directly on the comparator by using the opposite end of the pins.

18. Die Making Machine

Ability to compensate for the run out of files by side movement of upper moveable arm is one of the distinctions of Williams die making machine recently announced by Connecticut Tool & Engineering Co., 544 Iranistan Ave., Bridgeport 4, Conn. Lower



stationary arm and upper movable arm which support files and saws are mounted on a shaft rigidly held by bushings above and below work table. This construction insures perfect guidance of files, and saws and not only guarantees great accuracy but prevents bell mouthing in filing and allows rapid and accurate sawing.

Saw sizes that can be used range from jewelers saws up to those 3/8-inch width. Thickness of files ranges from 1/64 to 1/2-inch. Motor used is 1/2-horsepower, 1800 revolutions per minute on either 220 or 440 volts.

19. Micrometer

Designed for inside work—to take both inside and outside measurements of grooves and flanges on the inside of a bore, the model L longitudinal duplex micrometer, made by Richards Machine Tool Co., 124 South Isabel St., Glendale 5, Calif., will reach into a hole of ½-inch or over. Measurements made with this addition to the Rimat line may be

18-8

Tested and Proved

BY YEARS OF SERVICE
AS A RELIABLE
CORROSION RESISTANT MATERIAL

WHEN materials come out of the laboratory and into hard, work-a-day, practical use theory stops and experience begins. Gone are the "ifs" and "maybes". A month—a year—ten years, and the final answer is written on their real value. Written not in essays and monographs but in the cold dollars and cents of operating costs and product reliability.

Of all the "stainless" materials none have a finer record under the scrutiny of time than the "18 and 8" alloys. Castings made from this material in our foundry twenty years ago are still rendering reliable service today. That is why we *know* that castings which we will pour tomorrow in our alloy shop will be serving you just as well twenty years from now.

The specifications of one of the Circle Ⓛ family of "18 and 8" Stainless Alloys are given at left. For complete information on these tested and proved corrosion resistant materials, write to us.

LEBANON CIRCLE Ⓛ 22

NOMINAL ANALYSIS

Carbon Max.	0.07
Silicon	1.25
Manganese	0.75
Chromium	19.50
Nickel	9.00

NOMINAL PHYSICAL PROPERTIES

Tensile Strength	75,000
Yield Point	36,000
Elongation in 2"—%	50
Brinell Hardness	135

LEBANON STEEL FOUNDRY • LEBANON, PA.
"In The Lebanon Valley"
ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

LEBANON ALLOY AND STEEL Castings

CIRCLE L

made while instrument is held in place.

External measurements are made between points A and internal measurements between points B. Gradua-

tions are clear cut and measuring pins are hardened and ground on a radius to prevent cramping.

20. Stock Reels

Over 25 models are included in the line of stock reels and scrap winders announced by LaBahn Machine & Mfg. Co., Menlo Park, N. J. Reels are offered in spoke or disk type, with plain, automatic brake or motorized

spindles. A self-centering feature is available on most models.

Capacities range from 150 to 1000 pounds. Reels may be tilted from vertical to horizontal, through an arc of 90 degrees. They are supported on large cast iron bases and are adjustable for height. Most models have adjustable stock guides.

DEVELOPED BY . . .

21. Westinghouse Electric Corp., Pittsburgh 30, Pa., two Flexarc electrodes for direct or alternating current welding of cast iron. Castingweld and Freemachineweld electrodes hold thermal stresses to a minimum and prevent extreme hardness in heat affected zone.

22. Reliance Gauge Column Co., Cleveland 3, O., a liquid level alarm to set off warning signals when liquid levels in small boilers or tanks reach predetermined low or high levels. Called Levalarm, it may be used on pressures up to 250 pounds.

23. Photoswitch Inc., Cambridge 42, Mass., series 30 electronic timer for machinery and process control. Accurate within 2 per cent, it has a range of from 0.03 seconds to 4 minutes.

24. Air Reduction Sales Co., New York 17, N. Y., Airco No. 387 all position arc welding electrode for mild steel. For alternating or direct current use, it produces a minimum of spatter and is offered in four diameters.

25. Mueller Steam Specialty Co. Inc., Long Island City 1, N. Y., type 31 pressure reducing valve with woven Monel wire screen and large diaphragm with long flexible spring. For use with steam air, noncorrosive gases and liquids, valves bodies of various metals.

26. Aluminum Industries Inc., Cincinnati 25, O., Permite fungicide aluminum paint containing active ingredients to inhibit growth of fungus and mold and to resist attacks of termites.

27. B. F. Goodrich Co., Akron, O., sponge rubber standing mat, designed to relieve the fatigue, foot discomfort and aching leg and back muscles coming from standing. Mats measure ⅞ x 18 x 20 inches.

28. Severance Tool Industries Inc., Saginaw, Mich., hand files of cemented carbide with ground teeth numbering either 20 or 30 per inch. Widths are either ¾ or 1¼-inches. File has handle-holder with two carbide segments mounted in tandem.

29. Sunroc Refrigeration Co., Glen Riddle, Pa., a water cooler which has a 2 cubic foot refrigerated storage compartment and will freeze three trays of ice cubes. It will use either pressure or bottled water.

30. Super Tool Co., Detroit 13, Mich., an ejector tool application which cuts belt track on periphery of a pulley and faces edges at the same time.

31. Square D Co., Industrial Controller Division, Milwaukee 12, Wis., series of operators for their precision snap switches. Plunger, roller-leaf limit and door type operators are designed for adding to the basic mechanism.

32. Economy Blue Print Products Co., Chicago 47, Ill., Direc-Liner dry printing and developing machine, equipped with Hanovia type printing tube and revolving cylinder. Printing and developing units are "packaged" for easy replacement.

33. Hagan Corp., Pittsburgh, Pa., the Microtrans, an instrument for recording of physical motions by air pressures. It translates movements of 0 to 0.25-inch into pneumatic pressures over a range of 5 to 30 pounds.

34. Vacuum - Electronic Engineering Co., Brooklyn, N. Y., a mass spectrometer leak detector for industrial applications. It is for applications where a vacuum, fixed pressure or special atmosphere must be maintained in equipment for extended periods of time.

35. Robert H. Clark Co., Beverly Hills, Calif., CC expansive bit, model 251, with a two-blade cutting capacity of ⅞ to 3 inches. Its 8¼-inch shank is of chrome-moly steel. Blades are of heat treated chromium vanadium steel.

36. Ideal Industries Inc., Sycamore, Ill., electric etcher for permanently marking steel, iron and their alloys, regardless of hardness. Etching heats of 120, 240, 420 and 700 watts are provided.

37. Acro Metal Stamping Co., Milwaukee 12, Wis., small automatic lubricating device for motors, blowers, lineshafts, etc. Finger set screw sets oil level desired. Sight glass shows level of oil being fed to bearing while another shows total oil supply reservoir.

38. George Scherr Co. Inc., New York 12, N. Y., rustless chrome vernier caliper, made in Switzerland, for measuring from 0 to 6 inches in 1/1000 and 1/64-inch for outside, inside and depth dimensions. Thread root diameters may also be measured.

39. General Electric Co., Schenectady 5, N. Y., recording mass spectrometer capable of measuring over mass range from 1 to 350, adjustable to any portion of range. Use is for chemical analysis of gases and vapors in various fields.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL PRODUCTION—Steelmaking operations are falling under the impact of the coal strike and should the mine tieup continue for another two weeks there is a distinct possibility ingot output may drop below 60 per cent of capacity. Last week the national ingot rate was estimated at 93 per cent.

At the moment coke and pig iron are hardest hit. Beehive coke output is at a virtual standstill and oven coke production has been seriously reduced. Effect of the coal strike on pig iron is reflected in practically all producing centers with furnaces either being banked or blown out, or operated on reduced draft.

INGOT OPERATIONS—Open-hearth furnace operations have not been as severely hit as coke or pig iron. However, the squeeze is on and while the national ingot rate last week, estimated at 93 per cent, was down only 3 points from the preceding week, the current week is expected to witness an accelerating decline, followed by a slump in rolling mill schedules.

Severest cutback in steel operations last week occurred at Buffalo where the ingot rate sagged 22½ points to 85 per cent. Operations declined 8 points to 77 per cent in New England, 6 points to 96 at Cincinnati, 3 points to 98 at Youngstown, 2½ points to 97½ at Birmingham, and 1 point at Pittsburgh to 95½ per cent. Oddly enough, operations were 2 points higher in Detroit at 104 per cent, and ½ point higher in Chicago at 95.

STEEL SUPPLY—Proposed cut in steam freight, effective Mar. 30, will delay steel shipments to many consumers, and will add further to the difficulty of maintaining steel production. This latest disruption in steel output is contributing to substantial mill shipment arrearages. Most producers will have heavier carryovers than at the beginning of first quarter. Revisions in consumer quotas for second quarter are expected.

Some progress in laying the groundwork for renewed military demand is noted in steel circles, though to date there has been little new military buying. Some "feeler" inquiries for armor plate, alloy and special steels and shell steel have been received. A significant recent development is a surge in alloy steel demand.

ALLOCATIONS—Imposition of mandatory controls in the not distant future is given a 50-50 chance in informed circles in Washington. Government allocation of steel and other critical materials, as well as price controls, are said to be a likely possibility as defense demands exert increasing pressure on the economy. Voluntary allocation, it is said, will prove inadequate.

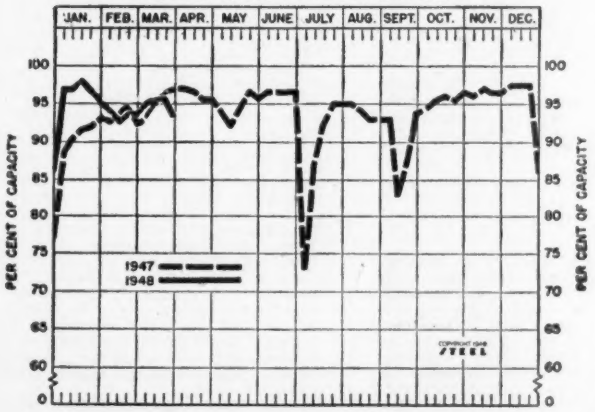
Currently, the voluntary allocations program is going ahead with a little more vigor than earlier in the year. Steel warehouse industry representatives have been asked to meet with OIC about Apr. 21 to discuss the possibility of developing a program to help solve the small steel buyer's supply problem.

John C. Virden, director, OIC, last week said he could not indicate even approximately the amounts of steel to be placed under voluntary allocation, but increases will be only a small percentage of total output.

PRICES—No further changes are reported in steel prices. However, uncertainty as to the future trend continues and this uncertainty is likely to prevail until steel wage negotiations, scheduled to begin Apr. 5, are out of the way.

Composite arithmetical price averages, as compiled by STEEL, held unchanged last week and compared with those for the like 1947 period as follows: Finished steel, $81.14 and $69.82; semifinished steel, $68.72 and $52.10; steelmaking pig iron, $39.31 and $32.59; steelmaking scrap, $40.24 and $37.50. STEEL's finished steel weighted composite for February, preliminary, is 3.54027c compared with 3.49997c for January and 3.09137c for like month, 1947.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Mar. 27	Change	Same Week 1947	Same Week 1946
Pittsburgh	95.5	— 1	99	96.5
Chicago	95	+ 0.5	94.5	91
Eastern Pa.	84	— 8	90.5	87
Youngstown	98	— 3	91	88
Wheeling	92.5	None	93.5	86
Cleveland	94.5	None	94	95.5
Buffalo	85	—22.5	90.5	85
Birmingham	97.5	— 2.5	99	95
New England	77	— 8	94	94
Cincinnati	96	— 6	87	81
St. Louis	77.5	None	75	49.5
Detroit	104	+ 2	90	88
Estimated national rate	93	— 3	97	89.5

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

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COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Mar. 27	Mar. 20	Month Ago Feb. 1948	Year Ago Mar. 1947	5 Years Ago Mar. 1943
Finished Steel	$81.14	$81.14	$79.86	$69.82	$56.73
Semifinished Steel	68.72	68.72	67.16	52.10	36.00
Steelmaking Pig Iron	39.31	39.31	39.30	32.40	23.00
Steelmaking Scrap	40.25	40.25	40.48	37.25	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Feb. 1948 (prelim.)	3.54027c
Jan. 1948	3.49997c
Feb. 1947	3.09137c
Feb. 1943	2.41359c

* Straight Arithmetical Composites: Computed from average industry-wide base prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading basing points), and on Steelworks Scrap (No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composite, dollars per net ton; pig iron and scrap, gross ton.

† Finished Steel Weighted Composite: Computed in cents per pound, base prices, weighted by actual monthly shipments of following products, representing 82 per cent of total steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute; Structural shapes; plates; standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton; others dollars per gross ton.

Finished Materials

	March 27, 1948	Feb., 1948	Dec., 1947	Mar., 1947
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.60c
Steel bars, del. Philadelphia	3.356	3.356	3.318	2.98
Steel bars, Chicago	2.90	2.90	2.90	2.60
Shapes, Pittsburgh	2.80	2.80	2.80	2.50
Shapes, del. Philadelphia	2.968	2.968	2.954	2.64
Shapes, Chicago	2.80	2.80	2.80	2.50
Plates, Pittsburgh	2.95	2.95	2.95	2.65
Plates, del. Philadelphia	3.19	3.19	3.17	2.85
Plates, Chicago	2.95	2.95	2.95	2.65
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Pittsburgh	3.95	3.95	3.90	3.55
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Gary	3.95	3.95	3.90	3.55
Strip, hot-rolled, Pittsburgh	3.05	2.925	2.80	2.50
Strip, cold-rolled, Pittsburgh	3.80	3.675	3.55	3.20
Bright basic, bess. wire, Pittsburgh	3.775	3.775	3.675	3.425
Wire nails, Pittsburgh	5.20	4.95	4.625	4.125
Tin plate, per base box, Pittsburgh	$6.70	$6.70	$5.75	$5.75

Semifinished

Sheet bars, Pittsburgh, Chicago	$60.00	$56.79	$60.00*	$50.00*
Slabs, Pittsburgh, Chicago	45.00	42.59	47.50*	42.00*
Rerolling billets, Pittsburgh	45.00	42.59	47.50*	42.00*
Wire rod 7/32 to 1/4-inch, Pitts.	3.175c	3.175c	3.05c	2.55c

* Per gross ton.

Pig Iron

	March 27, 1948	Feb., 1948	Dec., 1947	Mar., 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$40.996	$40.996	$37.913	$34.83
Basic, Valley	39.00	39.00	36.00	33.00
Basic, eastern del. Philadelphia	42.004	42.004	38.84	34.26
No. 2 fdry., del. Pgh. (N.&S. sides)	40.496	40.496	37.413	34.33
No. 2 fdry., del. Philadelphia	42.504	42.504	39.34	34.76
No. 2 foundry, Chicago	39.00	39.00	36.00	33.00
No. 2 foundry, Valley	39.50	39.50	36.50	33.50
Southern No. 2, Birmingham	37.88	37.88	34.88	29.28
Southern, No. 2, del. Cincinnati	42.23	40.74	37.74	34.15
Malleable, Valley	39.50	39.50	36.50	33.50
Malleable, Chicago	39.50	39.50	36.50	33.50
Charcoal, low phos., fob Lyles, Tenn.	55.00	55.00	50.00	40.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	151.00	140.25

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.25	$40.44	$40.00	$37.25
Heavy melt. steel, No. 2, E. Pa.	39.00	39.125	41.625	38.50
Heavy melt. steel, No. 1, Chicago	39.00	39.125	38.75	35.125
Heavy melt. steel, No. 1, Valley	40.25	40.25	39.75	37.19
Heavy melt. steel, No. 1, Cleveland	39.75	39.75	39.25	36.19
Heavy melt. steel, No. 1, Buffalo	44.00	43.63	42.50	37.75
Rails for rerolling, Chicago	49.50	51.00	58.625	46.75
No. 1 cast, Chicago	66.00	66.00	55.875	43.25

Coke

Connellsville, beehive furnace	$12.50	$12.50	$12.25	$8.875
Connellsville, beehive foundry	14.875	14.78	14.50	10.375
Chicago, oven foundry, del.	19.25	19.25	18.975	16.10

FINISHED AND SEMIFINISHED IRON STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $90-$95 per gross ton. Forging quality $46 per net ton, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56 per gross ton.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Buffalo, Birmingham, $45 per net ton; Cleveland, $47 per net ton; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $54 per net ton.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66 per gross ton.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60 nom., per net ton; sales in open market $95-105 per gross ton.

Skelp: Pittsburgh, Youngstown, 2.90c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-70 per net ton; some sellers quoting up to $120 per gross ton.

Wire Rods: Pittsburgh, Chicago, Birmingham, 7/32 to 1/4-inch, inclusive, $2.80-3.55 per 100 lb. 5/16 to 47/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.5245.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.06c; eastern Mich., 3.13c; New York, del., 3.392c; Phila., del., 3.356c; San Francisco (base, del.), 3.6345-3.95c; Los Angeles (base, del.), 3.629-3.86; Seattle, 3.8375c-3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.71c; Toledo, 3.78c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngston, base, 2.75c; San Francisco (base, del.), 3.3345c; Los Angeles (base, del.), 3.329c; Seattle, 3.88c-4.18c base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c, double refined 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Detroit, del., 2.96c; eastern Mich., del., 3.03; Philadelphia, del., 3.04c; New York, del., 3.172c; Los Angeles (base, del.), 3.544c; San Francisco, (base, del.), 3.5495c, (Alan Wood Steel Co., Conshohocken, Pa., quotes 4.20c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.71c; Eastern Mich., del., 3.78c; New York, del., 4.042c; Philadelphia, del., 4.006c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Canton, Middletown, 3.95c; Kokomo, 4.55c; Youngstown, 3.95c-4.45c; Granite City, 4.35c; New York, del., 4.322c; Philadelphia, del., 4.19c; Los Angeles (base, del.), 4.724c; San Francisco (base, del.), 4.7295c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.55c; copper-iron or pure iron, 4.90c; Granite City 5.00c and 5.35c, respectively; copper alloy, 4.90c, Kokomo. Los Angeles (base, del.), 5.344c; San Francisco (base, del.), 5.3495c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Stainless-Clad 20%, annealed and pickled: Pittsburgh, Washington, No. 304, 22.00c; No. 410, 20.00c; No. 430, 20.50c; No. 446, 27.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Middletown, 3.95c; Youngstown 3.95c-4.45c; Granite City, 4.05c; Detroit, del., 4.11c; eastern Mich., 4.18c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, 4.80c-5.30c; Chicago, Gary, 4.80c; Granite City, Ill., 5.25c; Kokomo, Ind., 4.90c. Electrical: Pittsburgh, 5.30c-5.80c; Chicago, Gary, 5.30c; Granite City, Ill., 5.75c; Kokomo, Ind., 5.40c. Motor: Pittsburgh, 6.05-6.80c; Chicago, Gary, 6.05c; Granite City, 6.50c.

Dynamo: Pittsburgh, 6.75c-7.00c; Granite City, 7.20c. Transformer 72, 7.25-8.25c; 65, 7.95-9.20c; 58, 8.65-9.90c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, 2.80c-3.30c; Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.96c; eastern Mich., del., 3.03c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, 3.55c-4.05c; Cleveland, Youngstown, 3.55c-3.85c; Chicago base, 3.65c; Detroit, del. 3.71c; eastern Mich., 3.78c; Worcester, base, 3.75c-4.45c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., per base box of 100 lb, 1.25 lb coating $6.60, 1.50 lb coating $6.80; Granite City, Birmingham, Sparrows Point, 1.25 lb coating $6.70, 1.50 lb coating $6.90.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.25 lb tin, $5.80; 0.50 lb tin, $6.00; 0.75 lb tin $6.20; Granite City, Birmingham, Sparrows Point, $5.90, $6.10, $6.30, respectively.

Can Making Black Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 55 to 70 lb basis weight, $5.20; 75 to 95 lb basis weight, $5.10; 100 to 128 lb basis weight, $5.20.

Holloware Enameling Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage, 4.75c per lb; Granite City, Birmingham, Sparrows Point, 4.85c per lb.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, per base box of 100 lb, $5.90; Granite City, Birmingham, Sparrows Point, $6.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, 3.45c; Claymont, 3.65c; Geneva, Utah, (base, del.), 3.125c; Det., del., 3.21c; New York, del., 3.322c; Phila., del., 3.19c; Boston, del., 3.423c; St. Louis, del., 3.269c; San Francisco and Los Angeles, del., 3.693c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.
(Central Iron & Steel Co., Harrisburg, Pa., 4.75c, basing points.)

Floor Plates: Pittsburgh, Chicago, Cleveland, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.80c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 24.00c. Pittsburgh, Washington, Coatesville, Pa., 20% stainless-clad, base prices including annealing and pickling; No. 304, 24.00c; No. 410, 22.00c; No. 430, 22.50c; No. 446, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.088c; Phila., del., 2.968c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41-3.474c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.543c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds.)

Wire to Manufacturers in carloads

Bright, basic or bessemer..... *$3.55-4.00
Basic MB Spring (except Birm.).. **$4.95
Upholstery Spring (except Birm.) †$4.60

Wire Products to Trade in carloads

Wire, Merchant Quality
Annealed (6 to 8 base) ..... ††$4.20
Galvanized (6 to 8 base) ..... ††$4.65
(Fob Pittsburgh, Chicago, Duluth, Birmingham, per base column).

Nails
Standard, cement-coated, galvanized.. ‡94
Staples, polished and galvanized..... ‡‡94
Woven fence, 15½ gage and heavier.. §100
Barbed wire, 80-rod spool ..... §§113
Fence Posts (with clamps)..... 107
Bale ties, single loop ..... §99

* Worcester, $3.65; Duluth, $3.60, base; San Francisco (base, del.), $4.56, bright basic only.

** Worcester, $5.05; Duluth & Trenton, N.J., $5.20 (bright only); San Francisco (base del.) $5.9845.

† Worcester $4.70; Duluth and Trenton, N. J., $4.85, base. San Francisco (base, del.) $5.6345 black upholstery.

†† One producer quotes 25 cents higher at Birmingham and Chicago; Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed, $4.65, galvanized. San Francisco (base, del.) $5.21, annealed, $5.66 galvanized.

‡ Cols. 108 and 114 also quoted Pittsburgh; Worcester 100; Cleveland 97; San Francisco (base, del.) 115.

‡‡ Cols. 108 and 114 also quoted Pittsburgh; Worcester 100, San Francisco (base del.) 115.

§ San Francisco (base del.) 123.

§§ San Francisco (base del.) 133.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.
Relaying, 60 lb and over fob warehouse $60-$65 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.65 per 100 lb, fob mill; $3.40 base, Seattle; $3.80 base, Pittsburg, Calif. Splice bars $3.85 per 100 lb, fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.50c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld		Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	44½	17	1	52½	36½
¼	44½	21½	1¼	53	37
⅜	41	17	1½	53½	37½
½	47	29½	2	54	38
¾	50	33½	2½ & 3	54½	38½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	44½	28	44	27½	43½	27
2½-3	48½	32	47	30½	46½	30
3½-6	50½	34	49	32½	48½	32

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	43½	1	51½
¼	43½	1¼	52
⅜	40	1½	52½
½	46	2	53
¾	49	2½ & 3	53½

In	Lap Weld	Elec. Weld	Seamless
2	43½	43	42½
2½ & 3	47½	46	45½
3½-6	49½	48	47½
8	55½	50	49½
10	55	49½	49
12	54	48½	48

Standard Wrought Iron Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh.

	Butt Weld		Lap Weld	
In	Blk.	Gal.	In	Blk.	Gal.
⅛	+11	+35	2	—1½	+20
¼	+ 1½	+25	2½-3½	—4	+16
1 and 1¼	— 4	+16½	4	—8	+10½
1½	— 9½	+13	4½-8	—6	+12
2	—10	+12½			

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		—Seamless—		—Elec. Weld—	
O.D.		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"	13	....	$12.46	$11.51	$11.51
1¼"	13	....	14.76	11.48	13.64
1½"	13	$14.00	16.47	12.69	15.22
1¾"	13	15.92	18.74	14.43	17.31
2"	13	17.84	20.99	16.17	19.39
2¼"	13	19.88	23.40	18.02	21.62
2½"	12	21.90	25.77	19.86	23.80
2¾"	12	23.99	28.21	21.75	26.06
3"	12	25.42	29.90	23.05	27.63
3¼"	11	31.06	36.55	28.16	33.77
3½"	11	33.35	39.26	30.23	36.27
4"	10	41.40	48.70	37.53	44.99
4½"	9	54.87	64.58	....	....
5"	9	63.52	74.74	....	....
6"	7	97.51	114.73	....	....

Pipe Cast Iron: Class B, 6-in. and over $79.50 per net ton, Birmingham; $84.50, Burlington, N. J.; $91.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 19c per cwt in carlots, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step, plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ⅝ x 6-in. and shorter	46 off
¾-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	46 off	....
½-in. and smaller	....	44 off
½-in.-1-in.	44 off	....
⅝-in.-1-in.	....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	48 off
¾, ⅞, & 1 x 6 and shorter	44 off

Square Head Set Screws

Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger 5.65c
Lebanon, Pa. ..... 5.65c plus 19c per cwt in cl., 26c lcl.
⅞-in and under ..... 55 off
Lebanon, Pa. ..... 55 off plus 19c per cwt in cl., 26c lcl.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1-$2 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.00	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
408	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442, 443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
†501	9.00	13.00	17.50	13.00	18.50
†502	10.00	14.50	18.50	14.50	19.50
‡STAINLESS CLAD STEEL (20%)					
304	....	24.00	22.00	....	....
410	....	22.00	20.00	....	....
430	....	22.50	20.50	....	....
446	....	29.00	27.00	....	....

† Low chromium. ‡ Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$40.00	$40.50	$41.00	$41.50
Newark, N. J., del.	42.208	42.708	43.208	43.708
Brooklyn, N. Y., del.	....	44.10	44.60	....
Philadelphia, del.	42.004	42.504	43.004	43.504
Birmingham, base	35.88†	36.38†	....	....
Cincinnati, del.	....	42.23	....	....
Buffalo, base	40.00†	40.00†	40.50†	41.00
Boston, del.	47.776	47.776	48.276	....
Rochester, del.	42.22	42.22	42.72	43.22
Syracuse, del.	43.025	43.025	43.525	44.025
Chicago, base	38.50	39.00	39.50	40.00
Milwaukee, del.	40.08	40.58	41.08	41.58
Muskegon, Mich., del.	....	43.60	44.10	....
Cleveland, fob furnace	38.50†	39.00†	39.50†	40.00
Akron, del.	40.50	41.00	41.50	42.00
Duluth, base	39.00	39.50	40.00	40.50
Erie, Pa., base	38.50	39.00	39.50	40.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	39.50	40.00	40.50	....
St. Louis, del.	40.25	40.75	41.25	....
‡**Neville Island, Pa.,** base	39.00	39.50	39.50	40.00
Pittsburgh, del., N.&S. Sides	39.996	40.496	40.496	40.996
Provo, Utah, base	39.00	39.50	....	....
Seattle, Tacoma, Wash., del.	....	46.63	....	....
Portland, Oreg., del.	....	46.63	....	....
Los Angeles, San Francisco	46.13	46.63	....	....
Sharpsville, Pa., base	39.00	39.50	39.50	40.00
Steelton, Pa., base	40.00	40.50	41.00	41.50
Struthers, O., base	39.50	....	....	....
Swedeland, Pa., base	45.00	45.50	46.00	46.50
Toledo, O., base	38.50	39.00	39.50	40.00
Cincinnati, del.	42.70	43.20	....	....
Youngstown, O., base	39.00	39.50	39.50	40.00
Mansfield, O.	42.57	43.07	43.07	43.57

† Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Jan. 1, 1948; Republic quotes $4.50 higher for No. 2 foundry and malleable and $4 higher for basic at Buffalo, and $1.25 higher at Cleveland, effective on shipments during week ended Mar. 28.

‡ To Neville Island base add: 79.2c for McKees Rocks, Pa., $1.212 Lawrenceville, Homestead, McKeesport, Monaco; $1.788 Oakmont; $1.596 Verona; $1.788 Brackenridge; 99.6c to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$49.50
6.51-7.00..$50.75 9.01- 9.50. 57.00
7.01-7.50.. 52.00 9.51-10.00. 58.25
7.51-8.00.. 53.25 10.01-10.50. 59.50
8.01-8.50.. 54.50 10.51-11.00. 60.75
8.51-9.00.. 55.75 11.01-11.50. 62.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $77.50, Jackson, O.; $78.75, Niagara Falls; $78 open-hearth and $79 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.05% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.....$55.00 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $39.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $46.00. Philadelphia, $48.592, delivered. Intermediate phosphorus, Central furnace, Cleveland, $42.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$13.00
Connellsville, foundry	14.00- 15.75
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$18.75
Chicago, outside del.	18.00
Chicago, del.	19.25
Terre Haute, ovens	18.50
Milwaukee, ovens	18.75
New England, del.	20.40-20.45
Birmingham, del.	15.76
Indianapolis, ovens	18.50
Cincinnati, del.	18.95
Ironton, O., ovens	16.75
Erie, Pa., del.	19.45
Painesville, O., ovens	18.10
Cleveland, del.	19.60
Buffalo, del.	20.15
Detroit, del.	19.00
Philadelphia, ovens	17.75
Swedeland, Pa., ovens	17.75
Portsmouth, O., ovens	17.00

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	21.00†
Toluol, two degrees	28.00
Industrial xylol	28.00
Solvent naphtha	28.00

Per pound fob works

Phenol (car lots, returnable drums)	12.50
Do., less than carlots	13.25
Do., tank cars	11.50

Eastern plants, per pound

Naphthalene flakes, balls, bbl. to jobbers, "household use"	11.00

Per ton, bulk, fob plants

Sulphate of ammonia	$40.00

† Freight allowed up to 2 cents.

Refractories

Net Prices

Per 1000, fob shipping point

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$92.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	73.00
Ala., Ga.	73.00
N. J.	78.00

Intermediate Heat Duty

Ohio	67.00
Pa., Ill., Md., Mo., Ky.	67.00
Ala., Ga.	59.00
N. J.	70.00

Low-Heat Duty

Pa., Md., Ohio	59.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	50.00
Wire Cut	48.00

Malleable Bung Brick

All bases	83.00

Silica Brick

Pennsylvania	73.00
Joliet, E. Chicago	82.00
Birmingham, Ala.	73.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	64.00
Chem. bonded chrome	64.00
Magnesite brick	86.00
Chem. bonded magnesite	75.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	27.00
Single bags	31.50

Dolomite

Domestic, dead-burned, bulk, net tons, fob Bilmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%	13.50-14.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26–$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 65.00-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo., cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheet, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	6.00	...	...	...	...	6.00	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30†	5.30†	5.30	...	...	...	...	...
Shapes, Structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

† Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½"& up	H-R Alloy (**4140)	Structural Shapes	Carbon ⅝"-¾"	Floor ⅝" & Thicker
Boston (city)	5.03	6.09[4]	5.79[4]	6.23[4]	7.58[4]	5.61	6.87	5.04	5.88	7.64	4.91	5.18	6.86
New York (city)	4.96	6.16	5.86	6.16	7.51	5.59	...	5.06	5.63	7.23	4.80	5.11	6.78
New York (country)	4.81	6.01	5.71	6.01	7.36	5.44	...	4.91	...	...	4.65	4.96	6.63
Philadelphia (city)	4.70	6.32	5.92	5.90	7.25	5.32	5.72	4.87	5.75	8.77	4.57	4.85	6.47
Philadelphia (country)	4.55	6.18	5.78	5.75	7.10	5.17	5.57	4.73	...	...	4.47	4.71	6.32
Baltimore (city)	4.32†	5.95	5.65	5.72	7.07	4.80	...	4.85	5.71	...	4.71	4.77	6.30
Baltimore (country)	4.17†	5.80	5.50	5.50	6.85	4.65	...	4.70	...	...	4.56	4.62	6.15
Washington (city)	4.81	...	...	...	...	5.08	...	5.14	5.79[13]	...	4.98	5.03	6.60
Washington (country)	4.71	...	...	...	...	4.98	...	5.04	...	...	4.88	4.93	6.50
Norfolk, Va.	4.90	...	...	...	...	...	...	5.20	6.00	...	5.15	5.15	6.90
Memphis, Tenn. (city)	4.82[20]§§	5.87[20]†	...	6.37	...	5.02[20]	...	4.97[20]	5.87	...	4.97[20]	5.17[20]	6.87[20]
Memphis, Tenn. (country)	4.72[20]§§	5.77[20]†	...	6.27	...	4.92[20]	...	4.87[20]	5.77	...	4.87[20]	5.07[20]	6.77[20]
Buffalo (city)	4.45	...	5.20[8]	6.05	...	5.25	5.65	4.40	5.10	6.85	4.40	5.00	6.25
Buffalo (country)	4.30	...	5.05[8]	5.50	...	4.70	5.50	4.25	4.95	6.85	4.25	4.45	5.75
Pittsburgh (city)	4.25§§	...	5.10[8]†	5.65	6.90	4.35	5.35	4.40	5.10	6.85	4.40	4.60	5.90
Pittsburgh (country)	4.10§§	...	4.95[8]†	5.50	6.75	4.20	5.20	4.25	4.95	6.85	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.82	7.17	4.55	5.35	4.40	5.10	7.26	4.70	4.60	6.05
Cleveland (country)	4.30	5.35[8]	5.05[8]	...	...	...	5.20	4.25	4.95	...	...	4.45	5.90
Cincinnati	4.56	...	5.22	5.77	...	4.77	...	4.78	5.63	...	4.82	4.98	6.47
Detroit	4.55	...	5.30	...	...	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[8]	...	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65	6.90	4.35	5.45	4.40	5.10	6.85[9]	4.40	4.60	6.00
Chicago (country)	4.30	5.35[8]	5.05[8]	5.50	6.75	4.20	5.30	4.25	4.95	6.85[9]	4.25	4.45	5.90
Milwaukee	4.658	5.708[8]	5.408[8]	5.858	7.108	4.558	5.658	4.608	5.308	7.208[9]	4.608	4.808	6.258
St. Louis	4.78	5.83[8]	5.53[8]	6.02	7.27	4.68	5.82	4.73	5.47[13]	...	4.73	4.93	6.38
Birmingham (city)	4.45[20]§§	...	...	5.65	...	4.45[20]	...	4.40[20]	5.93[22]	...	4.40	4.65	6.86
Birmingham (country)	4.30[20]§§	...	...	5.50	...	4.30[20]	...	4.25[20]	...	...	4.25	4.50	...
New Orleans	4.98[20]**	...	6.29[18]	...	...	5.18[20]	...	5.13[20]††	6.29[11]	...	5.03[20]††	5.33[20]	7.29[20]
Omaha, Nebr.	5.462	...	...	6.712	8.012	5.362	...	5.412	6.112	7.562	5.412	5.612	7.062
Houston, Tex.	5.75	...	...	7.36	8.10	6.00	...	5.35	7.00[12]	...	5.85	5.85	6.50
Los Angeles (city)	5.75	7.75[8]	7.45[8]	7.40	8.80	6.05	8.70	5.50	7.35[22]	9.35[10]	5.35	5.55	7.65
Los Angeles (country)	5.60	7.60[8]	7.30[8]	7.25	8.65	5.90	8.55	5.35	7.20[1]	9.20[10]	5.20	5.40	7.50
San Francisco	5.40[21]	6.65[5]	...	7.05[5]	7.95[5]	5.75[21]	8.70[15]	5.05[21]	7.00[12]	...	5.30[21]	5.50[21]	7.10[21]
Seattle, Tacoma, Wash.	5.30[17]§§	...	7.10[5]‡	6.95	...	5.60[17]	...	5.45[17]	7.45[19]	8.50[12]	5.25[17]	5.55[17]	7.65[17]
Portland, Oreg.	5.30[17]§§	...	7.10[5]‡	6.70	...	5.60[17]	...	5.45[17]	7.45[19]	...	5.25[17]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [13]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $52, Palmerton, Pa., $51, Pittsburgh, 16% to 19% Mn., $51, Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $157, ton lot $172, less ton $189; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23.25c, ton lot 24.35c, less ton 25.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17.25c, ton lot 18.35c, less ton 19.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.8c per lb of alloy, carload packed, 8.55c, ton lot 9.45c, less ton 10.45; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5 for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 18.6c per lb of contained Cr, c.l., packed 19.5c, ton lot 20.65c, less ton 22.05c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., 8MxD, bulk 20.1c per lb of contained Cr, c.l., packed 21.0c, ton lot 22.35c, less ton 24.1c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 28.5c per lb of contained Cr, 0.04% C 27.5c, 0.05% C 27.0c, 0.06% C 26.5c, 0.10% C 26.0c, 0.15% C25.5c, 0.20% C 25.25c, 0.50% C 25.0c, 1% C 24.5c, 2% C 24.25c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 25c per lb of contained chromium, carload, packed 26.1c, ton lot 27.3c, less ton 29.1c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Mn. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, packed, max. 0.50% C grade, 93c per lb of contained chromium, ton lot 94.5c, less ton 97c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight alowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 9.3c per lb of contained Si. carload packed 10.9, ton lot 12.35c, less ton 14.0c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (All 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.8c per lb of contained Si carload packed 13.1c, ton lot 14.25c, less ton 15.5c; Central, add 0.3c for c.l. add 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 13.3c per lb of contained, Si carload packed 14.55c, ton lot 15.55c, less ton 16.7c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 15c per lb of contained Si carload packed 16.2c, ton lot 17.15c, less ton 18.2c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, c.l., lump, bulk, regular 17.3c per lb of Si, c.l. packed 18.5c, ton lot 19.4c, less ton 20.4c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Aprox. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb c.l. 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 12.5c per lb or briquet, carload packed 13.2c ton lot 14.0c, less ton 14.9c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8.7c per lb of briquet, c.l. packaged 9.5c, ton lot 10.3c, less ton 11.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Eastern Zone, contract, c.l. bulk 8.75c per lb of briquet, c.l. packed 9.55c, ton lot 10.35c, less ton 11.25c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 5.1c per lb of briquet, c.l. packed 5.25c, ton lot 6.7c, less ton 7.6c. **(Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 5.25c, c.l. packed 6.05c, ton lot 6.85c, less ton 7.75c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 17.50c per lb of alloy, carload packed 19.0c, ton lot 19.8c, less ton 20.8c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 16.25c per lb of alloy, carload packed 16.45c, ton lot 19.35c, less ton 20.85c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 5% max., C 3% max.). Eastern Zone, contract, any quantity, $2.99 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.75c, ton lot 7.5c, less ton 8.35c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.40c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone, contract, 100 lb or more, 1" x D, $1.20 per lb of alloy, freight allowed. Less than 100 lb $1.30; Central, add 0.75c; Western add 2.9c, freight allowed. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si). $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, carload packed 17.25c per lb of material, ton lot 18.00c, less ton 19.25c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 39c per lb of alloy, ton lot 41c, less ton 43c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 15.0c per lb of alloy, ton lot 15.75c, less ton 17.0c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 10c, ton lots 10.25c, smaller lots 10.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: 17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo. fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Shortage of Nonferrous Metals Remains Acute

International and domestic developments contribute to consumers' increased concern over future supplies

NEW YORK — Consumers of copper, lead, zinc and aluminum are showing increased nervousness over present supplies. All of these major nonferrous metals are in short supply with domestic demand continuing active.

General world political uneasiness, the European Aid Plan, and strikes in Mexico have contributed to present concern of consumers. The government's stockpiles are comparatively small, but may be increased soon as a result of new studies now being made. Prices of all major metals held unchanged last week.

COPPER — Consumption of refined copper by fabricators declined 11,989 tons in February to 115,238 tons, according to the Copper Institute. The amount of copper consumed in February was greater than the supply of new metal received from producers, reducing users' inventories by 8731 tons to 406,029 tons. Working stocks were slightly lower at 297,451 tons.

Sales by consumers totaled only 83,676 tons, a drop of 38,956 tons from January. Unfilled orders declined 31,562 tons to 302,103 tons, compared with 556,239 tons at the end of August, 1946, when they began the present downtrend. The deficit in the consumers' sales position declined further to 96,460 tons. The gap between the supply of copper and unfilled orders was reduced by about 25,000 tons.

Pent-up demands for copper and copper products will not be satisfied for some time to come, according to Endicott R. Lovell, president, Calumet & Hecla Consolidated Copper Co., Boston. "The copper price is not high," he said, "when considered in relation to other commodities and in terms of today's purchasing power of the dollar. While it is unfortunate that present copper prices will cause many consumers to switch to cheaper substitutes, especially aluminum, this must be accepted as a natural competitive development. The net loss to the industry, however, should not be serious; for new uses of copper are constantly being found."

Kennecott Copper Corp. plans to build a multimillion dollar refinery at Garfield, Utah. The mill will have a capacity of 12,000 tons of refined copper monthly. The new plant will be Kennecott's first refining venture.

Red metal scrap prices continued firm to strong last week, due to slow movement of material. Refiners and brass ingot makers recently advanced their bids fractionally.

Consumers in the United Kingdom have been ordered to reduce their consumption of blister copper by 6 per cent, beginning Mar. 1; that of refined metal by 8 per cent, due to the acute dollar shortage.

LEAD — Eagle-Picher Sales Co. advanced prices, effective as of Mar. 20, for lead pigments $1 per 100 pounds and for lead oxides 15 cents per 100 pounds. Undertone of the primary lead market remained strong, reflecting in part the curtailment of production in Mexico due to labor difficulties.

ZINC — U. S. Commercial Co., RFC subsidiary, will sell about 855 tons of prime western zinc which it received from Japan. The material will be sold in 18 lots, most of which are about 100,000 pounds, for delivery fob carrier at seller's warehouse, Staten Island, N. Y. Schedule of weights and analyses and other details may be obtained, if requested before Mar. 31, from the company's offices, 811 Vermont Ave., Washington 25.

TIN — Final allocations of tin for the first half of 1948 have been issued by the Combined Tin Committee, making the total 33,241 tons. Principal additions made Mar. 24 include 7650 tons to the United States, making the total 17,850 tons; 2040 tons to France for a total of 4760 tons; 1050 tons to India for a total of 2450 tons; 815 tons to Canada for a total of 1905 tons; and 350 tons to Poland for a total of 870 tons.

NONFERROUS METAL PRICES

Copper: Electrolytic, carloads 21.50c, delivered Conn.; Lake, 21.62½c del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c 1000-4999 lb; 1½c, 500-999 lb; 2c 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 19.00-19.25c; 88-10-2 (No. 215) 28.00c; 80-10-10 (No. 305) 24.25c; No. 1 yellow (No. 405) 15.00-16.00c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 12.00c, brass special 12.25c, intermediate 12.50c, E. St. Louis; high grade 13.00c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 16.50-16.75; No. 12 foundry alloy (No. 2 grade) 16.25-16.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 16.50-17.00c; grade 2 (92-95%) 16.00-16.50c; grade 3 (90-92%) 15.75-16.00c; grade 4 (85-90%) 15.25-15.50c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c, fob Freeport, Tex.; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb. 42.00-46.00c; 100 to 4000 lb, 35.00-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (including Straits), 94.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 93.85c; Grade C, 99.65-99.79% incl. 93.50c; 99.00-99.64% 93.50c and 98.00-98.99%, 92.60c for tin content.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 224-999 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 33.75c lb; 25 lb pigs produced from electrolytic cathodes 35.25c lb; shot produced from electrolytic cathodes 36.25c lb; "F" nickel shots or ingots for addition to cast iron 34.25c lb. Prices include import duty.

Mercury: Open market, spot, New York, $76-$78 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg) $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y., 74.62½c, per ounce.

Platinum: $72-$75 per ounce.

Palladium: $24 per troy ounce.

Iridium: $95-$105 per troy ounce.

Rolled, Drawn, Extruded Products

Copper and brass product prices are fob mill, with freight prepaid on 200 lb or more.

Sheet: Copper 33.68c; yellow brass 30.16c; commercial bronze, 95% 33.80c, 90% 33.27c; red brass, 85% 32.23c, 80% 31.70c; best quality 31.09c; Everdur, Duronze, Herculoy or equiv., hot-rolled, 38.56c; nickel silver, 18%, 42.42c; phosphor bronze, grade A, 5%, 52.70c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.69c; commercial bronze, 95% 33.49c, 90% 32.96c; red brass, 85% 31.92c, 80% 31.39c; best quality 30.78c.

Seamless Tubing: Copper 33.72c; yellow brass 32.92c; commercial bronze 90% 35.68c; red brass 85% 34.89c, 80% 34.36c; best quality brass 33.50c.

Wire: Yellow brass 30.45c; commercial bronze, 95% 34.09c, 90% 33.56c; red brass, 85% 32.52c, 80% 31.99c; best quality brass 31.38c.

Copper Wire: Bare, soft, fob eastern mills, carlots 26.80c, less carlots 27.30c; weatherproof, fob eastern mills, carlots 27.35c, less carlots 27.85c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88.

Aluminum Sheets and Circles: 2s and 3s mill finish; base price, cents per pound, 30,000 lb or more, bulk or skid packing, fob shipping point. Transportation allowance: Actual transportation charges not exceeding the rail freight rate applicable to shipments of 30,000 lb are deducted on shipments of 500 lb or more.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	24.0	...	...
0.135-0.126	12-48	24.5	...	...
0.125-0.096	12-48	24.5	23.1	26.3
0.095-0.077	12-48	25.0	23.2	26.5
0.076-0.061	12-48	25.5	23.4	26.7
0.060-0.048	12-48	25.7	23.6	27.0
0.047-0.038	12-48	26.1	23.8	27.3
0.037-0.030	12-48	26.4	24.1	27.7
0.029-0.024	12-48	26.8	24.4	28.1
0.023-0.019	12-36	27.4	24.8	28.6
0.018-0.017	12-36	27.9	25.3	29.3
0.016-0.015	12-36	28.6	25.9	30.1
0.014	12-24	29.4	26.6	31.1
0.013-0.012	12-24	30.2	27.3	32.0
0.011	12-24	31.1	28.1	33.1
0.010-0.0095	12-24	32.1	29.0	34.3
0.009-0.0085	12-20	33.2	30.0	35.7
0.008-0.0075	12-20	34.4	31.1	37.1
0.007	12-18	35.7	32.3	38.8
0.006	12-18	37.0	33.5	42.6

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Lead Products: Prices to jobbers, fob Cleveland, Pittsburgh: Sheets, full rolls, 140 sq ft or more, 18.35c per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft; $1.25, less than 10 sq ft; $1, circles and segments.
Pipe: Full coils, 17.60c per cwt; cut coils, 17.85c.
Lead Traps and Bends: List price plus 42%.

Zinc Products: Sheet, 16.50c-17.00c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 15.25c-16.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 14.25c; over 12-in., 15.25c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 22.00c; 5 tons and over 22.50c; 1 to 5 tons, 23.00c; less than 1 ton, 23.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu; 50 lb bags, 25.00c fob Cleveland.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c, 3000 to 10,000 lb, 50.00c; 500 to 3000 lb. 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 23.50c; 275-lb, or 500 bbls. 21.50c, fob Cleveland.

Tin Anodes: Bar, 1000 lb and over 110.00c, 500 to 1000 lb, 110.50c; 200 to 5000 lb, 111.00c; less than 200 lb, 112.50c; ball, 1000 lb and over, 112.25c; 500 to 1000 lb. 112.75c; 200 to 500 lb, 113.25c; less than 200 lb, 114.75c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers and resellers, 67.4c; 100 or 300 lb drums only, 100 to 500 lb, to consumers 59.2c, to resellers 54.8c; 600 to 1900 lb, to consumers 56.8c, to resellers 52.5c; 2000 to 9900 lb, to consumers 55.0c, to resellers 50.9c; 10,000 lb or more l.c.l., to consumers 53.9c, to resellers 49.9c; carloads, to consumers 52.7c, to resellers 48.7c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland or Detroit; 35.00, fob Philadelphia.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.625	15.375	14.750
Commercial Bronze			
95%	18.125	17.875	17.375
90%	17.625	17.375	16.875
Red brass			
85%	17.500	17.250	16.750
80%	17.250	17.000	16.500
Best Quality (71-79%)	16.625	16.375	15.875
Muntz Metal	14.750	14.500	14.000
Nickel silver, 5%	16.500	16.250	8.250
Phos. bronze, A. B.	20.750	20.500	19.500
Naval brass	15.250	15.000	14.500
Manganese bronze	15.250	15.000	14.375

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

'No. 1 copper 17.50-17.75, No. 2 copper 16.50-16.75, light copper 15.50-15.75, composition red brass 14.75, auto radiators 11.50, heavy yellow brass 10.75, brass pipe 11.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.50, No. 2 copper 17.50, light copper, 16.50, refinery brass (60% copper), per dry copper content 16.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.25-16.75, No. 2 15.50-16.00, light copper 14.25-14.75, No. 1 composition red brass 12.00-12.50, No. 1 composition turnings 11.50-12.00, mixed brass turnings 7.25-7.50, new brass clippings 12.50-13.00, No. 1 brass rod turnings 10.00-10.50, light brass 6.50-7.00, heavy yellow brass 8.75-9.00, new brass rod ends 10.50-11.00, auto radiators, unsweated 9.75-10.25, cocks and faucets 9.50-10.00, brass pipe 9.50-10.00.

Lead: Heavy 13.50-14.00, battery plates 7.50-7.75, linotype and stereotype 14.50-15.00, electrotype 12.00-12.50, mixed babbitt 13.50-14.00, solder joints 16.50-17.00.

Zinc: Old zinc 5.50-5.75; new die cast scrap 4.75-5.25, old die cast scrap 2.75-3.25.

Tin: No. 1 pewter 60.00-62.00, block tin pipe 77.00-78.00, auto babbitt 45.00-47.00, No. 1 babbitt 45.00-48.00, siphon tops 45.00-47.00.

Aluminum: Clippings 2S 9.00-9.50, old sheets 7.00-7.50, crankcases 7.00-7.50, borings and turnings 2.50-3.00, pistons, free of struts, 6.00-6.50.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
January Average:	21.500	14.825	11.056	94.000	15.000	33.000	33.750	74.625
Feb. Average ..	21.500	14.825	12.000	94.000	15.000	33.000	33.750	74.625
Mar. 1-25	21.500	14.80-14.85	12.000	94.000	15.000	33.000	33.750	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Busheling	40.00-40.50*
Nos. 1, 2 & 3 Bundles	40.00-40.50*
Machine Shop Turnings	35.50-36.00
Mixed Borings, Turnings	35.50-36.00
Short Shovel Turnings.	36.00-37.00
Cast Iron Borings	36.00-37.00
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Heavy Turnings	40.00-40.50

Cast Iron Grades

No. 1 Cupola	65.00-66.00
Charging Box Cast	48.00-49.00
Heavy Breakable Cast.	48.00-49.00
Unstripped Motor Blocks	52.00-53.00
Malleable	69.00-70.00
Brake Shoe	52.00-53.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
R.R. Malleable	75.00-80.00
Axles	51.50-52.00
Rails, Rerolling	56.00-57.00
Rails, Random Lengths	58.00-59.00
Rails, 3 ft and under	60.50-61.00
Rails, 18 in. and under	61.50-62.00
Railroad Specialties	54.00-55.00
Uncut Tires	52.00-52.50
Angles, Splice Bars	53.00-54.00

*Plus applicable freight spring-board.

CLEVELAND

No. 1 Heavy Melt. Steel	$39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Busheling	39.50-40.00*
Nos. 1 & 2 Bundles	39.50-40.00*
Machine Shop Turnings	34.50-35.00
Mixed Borings, Turnings	34.00-36.00
Short Shovel Turnings.	35.50-36.00
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Heavy Turnings	39.50-40.50
Alloy Free Turnings	37.50-38.50
Cut Structurals	46.00-49.00

*Plus applicable freight spring-board.

Cast Iron Grades

No. 1 Cupola	68.00-70.00
Charging Box Cast	58.00-60.00
Stove Plate	58.00-60.00
Heavy Breakable Cast.	54.00-56.00
Unstripped Motor Blocks	58.00-60.00
Malleable	73.00-78.00
Brake Shoes	52.00-53.00
Clean Auto Cast	68.00-70.00
No. 1 Wheels	58.00-60.00
Burnt Cast	56.00-57.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*
R.R. Malleable	73.00-78.00
Rails, Rerolling	57.00-58.00
Rails, Random Lengths	56.00-57.00
Rails, 3 ft and under	61.00-63.00
Cast Steel	56.00-58.00
Railroad Specialties	53.00-55.00
Uncut Tires	56.00-57.00
Angles, Splice Bars	57.00-59.00

*Plus applicable freight spring board.

VALLEY

No. 1 Heavy Melt. Steel	40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Bundles	40.00-40.50*
Machine Shop Turnings	34.50-35.50
Short Shovel Turnings.	36.50-37.00
Cast Iron Borings	36.00-36.50
Low Phos.	46.00-47.50

*Plus applicable freight spring-board.

Railroad Scrap

No. 1 R.R. Heavy Melt. 40.50-41.50*

*Plus applicable freight spring board.

MANSFIELD

Machine Shop Turnings	$35.00-35.50
Short Shovel Turnings.	37.00-37.50

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings.	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	55.00
Charging Box Cast	43.00
Heavy Breakable Cast.	50.00
Stove Plate	47.00
Unstripped Motor Blocks	45.00
Brake Shoes	45.00
Clean Auto Cast	55.00
Drop Broken Cast	60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50
R.R. Malleable	68.00
Rails, Rerolling	53.00
Rails, Random Lengths	50.00
Rails, 18 in. and under	60.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 1 Busheling	35.00-35.50
Nos. 1 & 2 Bundles	35.00-35.50
No. 3 Bundles	35.00-35.50
Machine Shop Turnings	29.00-29.50
Mixed Borings Turnings	29.00-29.50
Short Shovel Turnings.	30.00-30.50
Cast Iron Borings	30.00-30.50
Punchings & Plate Scrap	40.00-40.50

Cast Iron Grades

No. 1 Cupola Cast	60.00-62.00
Heavy Breakable Cast.	50.00-52.00
Clean Auto Cast	62.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$43.00-45.00
No. 2 Heavy Melt. Steel	39.75-40.25
No. 1 Busheling	39.75-40.25
No. 1 & 2 Bundles	39.75-40.25
Machine Shop Turnings	34.75-35.25
Mixed Borings, Turnings	34.75-35.25
Cast Iron Borings	35.75-36.26
Short Shovel Turnings.	36.75-37.25
Low Phos.	46.00-47.00

Cast Iron Grades

No. 1 Cupola	60.00-62.00
Mixed Cupola	58.00-60.00
Heavy Breakable Cast.	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under.	56.00-58.00
Railroad Specialties	52.00-53.00

PHILADELPHIA

No. 1 Hvy. Melt. Steel	$41.50
No. 2 Hvy. Melt. Steel	39.00
No. 1 Busheling	39.00
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Machine Shop Turnings	34.00-35.00
Mixed Borings, Turnings	34.00-35.00
Short Shovel Turnings.	34.00-35.00
Bar Crop and Plate	44.50-45.50
Punchings & Plate Scrap	44.50-45.50
Cut Structurals	44.50-45.50
Elec. Furnace Bundles.	43.50-44.50
Heavy Turnings	42.50-43.00
No. 1 Chemical Borings	42.00-43.00

Cast Iron Grades

No. 1 Cupola Cast	64.00-65.00
No. 1 Machinery Cast.	66.00-67.00
Charging Box Cast	60.00-61.00
Heavy Breakable Cast.	60.00-61.00
Unstripped Motor Blocks	61.50-62.50
Malleable	74.00-76.00
Clean Auto Cast	64.00-65.00
No. 1 Wheels	67.00-68.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.03
No. 2 Heavy Melt. Steel	34.03
No. 1 Busheling	34.03
Nos. 1 & 2 Bundles	34.03
No. 3 Bundles	32.03
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings.	30.50-31.00
Punchings & Plate Scrap	39.00-40.00
Cut Structurals	39.00-40.00
Elec. Furnace Bundles.	39.00-40.00

Cast Iron Grades

No. 1 Cupola Cast	58.00-60.00
Charging Box Cast	55.00-57.00
Heavy Breakable	55.00-57.00
Unstripped Motor Blocks	52.00-54.00
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.40-31.90
No. 2 Heavy Melt. Steel	31.40-31.90
No. 1 Bundles	31.40-31.90
No. 1 Busheling	31.40-31.90
Machine Shop Turnings	26.90
Mixed Borings, Turnings	27.00-28.00
Short Shovel Turnings.	28.90
Bar Crops and Plate	35.00-37.00
Punchings & Plate Scrap	35.00-37.00
Chemical Borings	34.00-35.00

Cast Iron Grades

No. 1 Cupola Cast	55.00-60.00
Heavy Breakable Cast.	53.00-55.00
Stove Plate	50.00-52.00
Unstripped Motor Blocks	40.00-41.00
Clean Auto Cast	48.00-50.00

CHICAGO

No. 1 Heavy Melt Steel	$38.50-39.50
No. 2 Heavy Melt. Steel	38.50-39.50
No. 1 Bundles	38.50-39.50
No. 2 Bundles	38.50-39.50
No. 3 Bundles	36.50-37.50
Machine Shop Turnings	33.50-34.50
Mixed Borings, Turnings	33.50-34.50
Short Shovel Turnings.	35.50-36.50
Cast Iron Borings	34.50-35.50
Bar Crops and Plate	46.00-47.00
Punchings	47.50-48.50
Elec. Furnace Bundles.	39.50-40.50
Heavy Turnings	38.00-39.00
Cut Structurals	43.50-44.50

Cast Iron Grades

No. 1 Cupola Cast	65.00-67.00
Clean Auto Cast	65.00-67.00
No. 1 Wheels	53.00-56.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.25-41.75
Malleable	70.00-71.00
Rails, Rerolling	49.00-50.00
Rails, Random Lengths	46.50-47.50
Rails, 3 ft and under.	55.00-56.00
Rails, 18 in. and under	57.00-58.00
Railroad Specialties	49.00-50.00
Angles, Splice Bars	50.00-51.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$39.50-40.50
No. 2 Heavy Melt. Steel	37.50-38.50
Machine Shop Turnings	32.50-33.50
Short Shovel Turnings.	34.50-35.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-67.00
Mixed Cast	60.00-62.00
Heavy Breakable Cast.	53.00-55.00
Brake Shoes	54.00-55.00
Clean Auto Cast	64.00-66.00
Burnt Cast	58.00-59.00

Railroad Scrap

R.R. Malleable	65.00-70.00
Rails, Rerolling	50.50-52.50
Rails, Random Lengths	49.50-51.50
Rails, 3 ft and under	53.00-55.00
Uncut Tires	46.00-47.00
Angles, Splice Bars	46.00-48.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	51.00
Stove Plate	43.00
No. 1 Wheels	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	45.00
Axles, Steel	39.00
Rails, Rerolling	52.00
Rails, Random Length.	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	26.00
No. 1 Busheling	26.00
Nos. 1 & 2 Bundles	22.00-23.00
No. 3 Bundles	22.00-23.00
Machine Shop Turnings	14.50-16.50
Mixed Borings, Turnings	14.50-16.50
Punchings & Plate Scrap	26.00-28.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	40.00
Charging Box Cast	25.00
Heavy Breakable Cast.	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast 35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melting	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	28.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-48.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

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Yes—and cane-bottom chairs in ordnance plants, farm implements in tank arsenals

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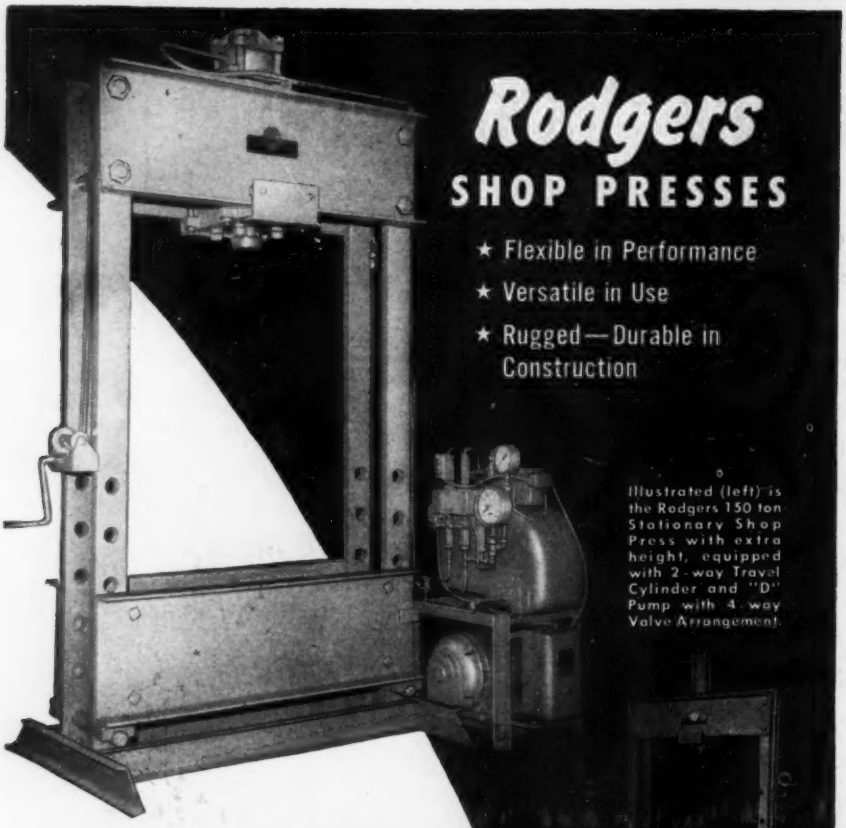

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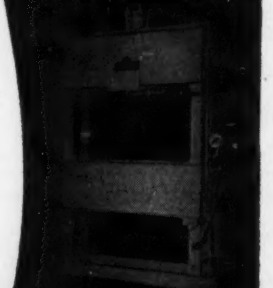

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Sheets, Strip . . .

Demand for electrical sheets seen spurred by increased defense requirements

Sheet Prices, Page 128

New York—Evidences of livelier interest in defense work are beginning to appear in recent sheet steel orders for accessory parts for aircraft and for Signal Corps equipment. These orders have included stainless steel and electrical sheets. So far they have not resulted in any particular need for switching schedules that requirements may be given preference, although there is little doubt that if preference had been indicated it would have been given, if at all possible.

Meanwhile, civilian demand for the major items, such as hot and cold-rolled sheets, continues strong, with mills generally several weeks behind on delivery promises. Special stringency also continues in galvanized sheets.

Boston — Unless cold mills get more hot-rolled steel than now indicated, users of cold-rolled narrow strip will be on short rations indefinitely with a more critical period likely in late second quarter. High carbon grades are increasingly difficult to obtain and rerollers show concern as to securing enough hot-rolled steel to match cold reduction schedules; currently revisions are more frequent. May rolling schedules for hot strip are in, mostly for June delivery, but little tonnage has been firmly booked for rolling for July shipment. Orders for cold strip are lighter, but this reflects inability of producers to accept additional volume rather than any slackening in demand. On the whole, conditions are building up for a reduction in third quarter fixed quotas due to heavy, but unpredictable carryovers. As in other flat-rolled products, alloy volume is affected by tie-in sales, notably in stainless. Some, without low carbon to sweeten alloy orders, are losing business to consumers in need of carbon stock, the latter willing to place a stainless or alloy order to obtain carbon steel. That there has been more tie-in business than generally assumed is indicated by the fact warehouses are not experiencing the lift in alloy volume reported at mill levels.

Philadelphia — Sheet production is beginning to taper as an indirect result of the coal dispute. Unless a settlement is reached fairly soon, sheet production is going to be cut drastically. Most producers believe that they will have to revise their second quarter quotas, as a result, and at the same time, are keeping their fingers crossed on the possible need for such action as a result of other developments, particularly a stepping up in defense requirements. So far, little direct tonnage can be traced to a broadening in these requirements; where it has happened, it has been principally in electrical sheets, which have not been in too stringent supply recently.

Pittsburgh — Openings in sheet and strip rolling schedules that occasionally occur are filled quickly and there is no noticeable let-up in pressure for prompt deliveries. However, buyers and sellers are closely watching for indications of backing up in inven-

What is zinc?

zinc (zĭŋk), *n.* [G. *zink*, prob. akin to *zinn* tin : cf. F. *zinc*, fr. G. Cf. TIN.] **1.** *Chem.* A bluish white crystalline metallic element, brittle when cold, malleable at 120–150° C. (250–300° F.), and very brittle at 200° C. It is practically unaffected by air and moisture at ordinary temperatures. Symbol, *Zn*; at. wt., 65.37. Zinc melts at 420° C. (788° F.). At about 930° C. it boils, yielding vapors which burn in air, forming the oxide. Sp. gr. of zinc, 7–7.2. Weight of a cubic foot, 437–450 lbs.

The average man probably knows little of the metal's wide application and its many useful functions. For zinc is frequently used in conjunction with other metals, and then its identity may be more or less concealed. For example, the great volume of iron and steel products which are galvanized, i.e. zinc-coated, as protection against corrosion, has for many years accounted for the metal's largest single use. In brass, of which it is an essential constituent, the zinc is invisible. Zinc oxide, which is particularly important as a paint pigment and as a rubber ingredient, is a white, fine powder which gives no hint of its relationship to the base product. Zinc alloy die castings which, incidentally, are now beginning to crowd galvanizing as the chief outlet for zinc, are frequently covered with a variety of beautiful finishes for purely decorative purposes.

In galvanizing, the spangled appearance of the zinc coating may also be decorative, but its chief purpose is to protect iron and steel products against corrosion. For this purpose, zinc is superior to all other metals. According to the U. S. Bureau of Standards, zinc forms "by far the best" protective metallic coating for the rust-proofing of iron and steel. Due to its low melting point, it is a comparatively simple matter to secure a tight bond between the zinc coating and the iron or steel base. Moreover, as iron stands below zinc in the electro-chemical series, a coating of zinc provides iron and steel with perfect electrolytic protection against rust. The electropositive metal, ZINC, suffers corrosion while protecting the electronegative metal, IRON. The effect is that corrosion goes on with the zinc exclusively; the iron is not corroded provided any zinc is left on its surface. It is because of these inherent properties that zinc takes precedence as the ideal protective agent for iron and steel products.

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tories in consumer goods. One seller states there is some indication of a slight down trend in the future demand for electrical sheets going into fractional horsepower motors and ballast for fluorescent lamps. Sellers generally have established second-quarter production schedules without making any allowance for threat of disruption to output resulting from the coal strike. Another uncertain factor is preferred steel allocation to meet needs under the Marshall and defense plans. One steel producer reports rather significant increase in stainless steel orders resulting from augmented aircraft production program now under way at some of its customers' plants.

Cleveland — Contemplating effects of the coal miners' work stoppage on steel supply, many sheet and strip users were inquiring at steel company offices last week as to the status of their orders and possibilities of deliveries before steel and rolling mills are forced to suspend operations. Mills were planning to continue full-scale operations through the end of March, then deciding what course to follow in view of the coal strike.

Chicago — Sheet and stripmakers report negligible cancellations, with most consumers consistently maintaining that their quotas are inadequate. Despite this, however, more companies which use flat-rolled products are meeting stiffer sales resistance and those who have been acquiring some requirements in the gray market are becoming more cautious in committing themselves in such deals. One mill in this district which has engaged in conversion of semi-finished to sheets and strip has opened its books for third quarter.

Cincinnati—Sheet mills note an upturn in inquiries from airplane manufacturers, many of these showing interest in stainless steel sheets. Otherwise, indications of Army and Navy requirements at this time appear routine. Stainless is in comparatively easy supply, but the tight situation in carbon steel is such that any imminent military demands would seriously upset planned mill schedules.

Birmingham — Sheet consumers are resigned to an extended shortage. There is no indication that sheet output will be measurably greater until completion of conversion from hot to cold-rolled at Fairfield and even that will not take care of demands unless an unwanted slump materializes. Several would-be new sheet processors have given up production plans for the district.

St. Louis — Output of cold-rolled sheets is picking up a bit as Granite City Steel Co. gradually increases tempo of its new reduction mill. Demand shows no signs of diminishing and deliveries are falling farther behind.

Wire . . .

Wire Prices, Page 129

Birmingham — Demand for wire and wire products shows not the slightest indication of leveling off. As a matter of fact, demand has registered a perceptible increase over the past few days due to warmer weather and a noticeable increase in farm work activity. Wire processors are still casting about for relatively small lots wherever available.

Plates . . .

Stringency in plates most severe since the war, according to some interests

Plate Prices, Page 129

Boston—Large storage tank completions extend into next year with most municipalities asking for erection before next winter, shortages of and extended deliveries on plates being the major problem. Contracts for several hundred tons required for standpipe and storage tanks have been placed, including 150 tons, West Bridgewater, Mass. Sandwich, Mass., has specifications out for a 130-ton standpipe.

Several New England points are included in the storage tank expansion program, Socony-Vacuum Oil Co., New York, adding facilities for 61 million gallons and requiring 6000 tons of steel, mostly plates. Units will be erected at Worcester and Quincy, Mass., Rutland, St. Johnsbury and Burlington, Vt., Portland and Auburn, Me., and New Haven, Conn. Facilities are for the storage of fuel oil, kerosene and gasoline. For delivery at various yards, the Navy is also more active for plates, including 3815 tons hull steel, black and galvanized, also 150 tons of floor plates. There is no improvement in volume of plates available and one large supplier has blanked out warehouses for May.

New York — Stringency in plates is the most pronounced since the war, according to some mill interests. This is due in part to the operating difficulties of the past winter and in part to the general pressure for plates, particularly from car builders. Under the voluntary allocation program, plate makers generally are having to supply much more steel for railroad equipment than normally and at the expense of other consumers. For instance, one mill office here has not as yet been able to set up second quarter quotas for its jobber customers, due largely to the requirements of car shops.

Brooklyn Eastern District Terminal has placed four welded steel car floats, with a capacity of 17 cars each, to local yard of Bethlehem Steel Co.

Philadelphia — Plate production is scheduled for another setback as a result of coal stoppages. Some producers estimate they can carry on for another week or two without curtailment; others say their production will be hit before that. Meanwhile, demand continues highly active, and overall plate supply has not been as stringent in months. Moreover, with plain carbon plates a none too profitable item under present conditions, there is a disposition on the part of producers to set themselves up to do more fabricating. Three different plate mills, in fact, are now interested in getting into pipe production, at least as a side line, thus taking advantage of the strong market which now prevails, particularly in line pipe.

Pittsburgh — Demand-supply relationship in carbon plates is more distorted than in sheets and strip, due to extremely heavy demand from such programs as: Railroad, line pipe, stand-by fuel tanks and equipment, barges, heavy industrial machinery,

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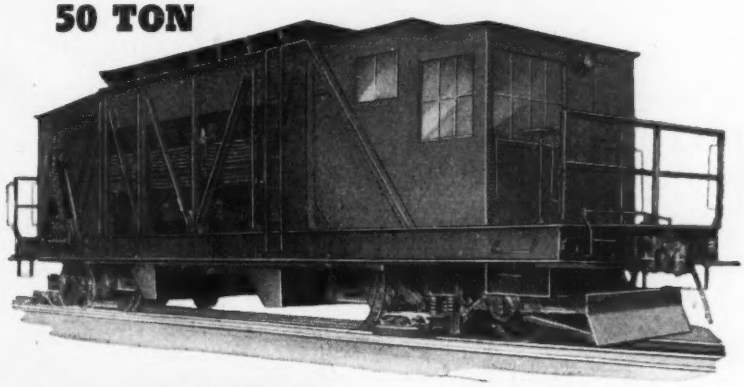

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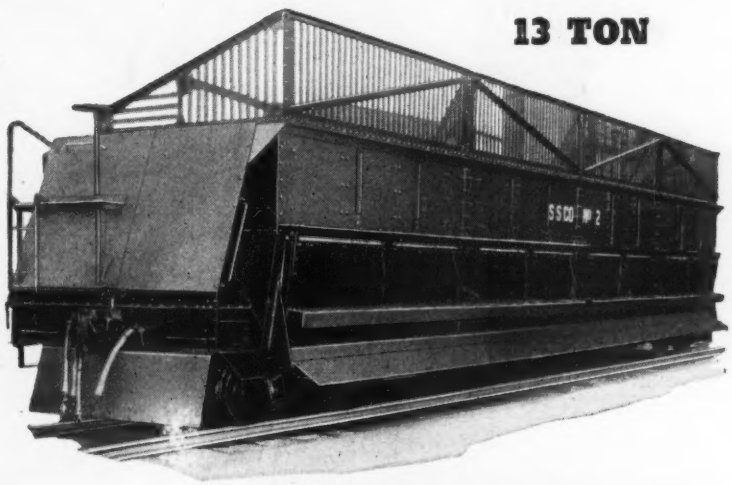

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and tankers. This latter requirement classification probably is tied in with recent voluminous report on the petroleum industry's steel needs for next 18 months, variously estimated from 6 to 15 million tons. An estimated 20 to 25 contracts recently have been placed covering the tanker program. Accentuating the overall tight plate supply is decision of some producers to channel a greater portion of steel output into pipe production, while at least one fabricator soon is expected to be producing pipe on a commercial basis. Some pipe sellers have received "feeler" inquiries as to what deliveries are available for armor plate specifications should the necessity arise for a resumption of large scale purchasing.

Birmingham — Plate production holds close to capacity here, but supplies continue inadequate. Plate users generally are reconciled to the fact that they will not get adequate supplies at any time in the near future. Improved allocations are reported for car building at Bessemer.

Steel Bars . . .

Bar Prices, Page 128

Pittsburgh — Further improvement in hot-rolled and cold-finished alloy bar orders, particularly from automotive suppliers, is noted. Deliveries on electric furnace hot-rolled alloy bars are extended 6 to 8 weeks, while order backlogs of open-hearth alloy bars represent 3 to 4 months. Open-hearth alloy production continues to represent bulk of alloy steel output. To date, sellers have not experienced any revisions in specifications or new orders directly attributed to the national defense program. However, some "feeler" inquiries have been received involving bearing steels, etc. Carbon cold-finished bar supply has tightened in recent weeks, reflecting duplicate ordering in a few instances. However, this situation also reflects inability of cold finishers to operate anywhere near capacity because of insufficient semifinished steel. Leading merchant bar producers are entering second quarter with sizable carryovers, representing over one month's output in most instances.

New York—Alloy bar deliveries are gradually becoming more extended. One large producer is promising hot-rolled electric furnace alloys for delivery in May and hot-rolled open-hearth alloys for delivery in August, with the cold-drawn alloys being offered on about the same schedule.

Demand for alloys is becoming more diversified and an increasingly tighter situation is anticipated once domestic defense requirements begin to expand. The proposed aircraft program, likely to be the first to feel the effects of this expansion, is expected to consume a substantial quantity of alloy bars.

Cold-drawn carbon bars are in improving demand. Large diameter bars can be had fairly soon, but in the smaller sizes of cold-drawn at least one large seller is sold up solidly into September.

Hot-carbon bar sellers are practically out of the market, being tightly booked up for the second quarter and having not as yet set up quotas for third quarter. Some of the larger sizes of hot carbon bars can be picked up by careful shopping, but such tonnage is the exception to the rule.

National Defense Needs May Tighten Steel Supply

Cincinnati — Although steel supplies appear easier at the present time, possibility of heavier demands for the national defense program creates an uncertainty for the near future, according to Robert M. Nelson, marketing and service executive, American Rolling Mill Co., Middletown, O.

Speaking at a convention of the Ohio State Sheet Metal Contractors Association, he said stoppages in the coal mines may also lead to tighter supplies. He held out slight hope that galvanized sheets would be more readily available, and hinted that stainless steel may well be substituted in some cases.

Tin Plate . . .

Tin Plate Prices, Page 129

Pittsburgh — Tin plate production schedules have been well sustained throughout the first quarter, in sharp contrast to that noted for other steel products which were adversely affected by industrial gas shortage. The industry generally has relatively small carry-over tonnage on its books for second-quarter delivery. Only minor changes in specifications for orders scheduled next quarter have been necessary due to the revisions in tin coating limitations under the revised container conservation order M-81. Apparently most can companies anticipated these revisions before entering second-quarter order specifications. Despite the increase in theoretical capacity scheduled to become operative this year, overall output of tin plate is not expected to substantially exceed the 3.7 million tons produced in 1947. The amount of pig tin allotted to the industry this year, about 32,000 tons, also is unchanged from a year ago. Pressure for delivery of all types of tin containers shows no signs of abating.

Washington — Continental Can Co. has filed an action with the United States District Court seeking an injunction to restrain the Department of Commerce from enforcing direction 10 to conservation order M-81. This direction restricts the total amount of tin that can be used by can manufacturers in 1948, imposes specific restrictions on production of cans for beer and animal food, and completely prohibits the use of tin plate in making cans for coffee and certain other products.

Hans A. Eggerss, president of the company, said at the time of filing the action that the order is unrealistic and discriminatory. "If the specific product restrictions of this order are sustained," he said, "it is estimated that less than 1000 tons of tin, out of an estimated total consumption of 88,000 tons and an estimated supply of 105,000 tons, would be saved in 1948. At the same time a barricade of restrictions would be built up around tin can manufacturers and their customers, while other major tin using industries—which accounted for more than 70 per cent of the tin consumed in this country last year—would go scott free, unhampered by quotas or amount limitations."

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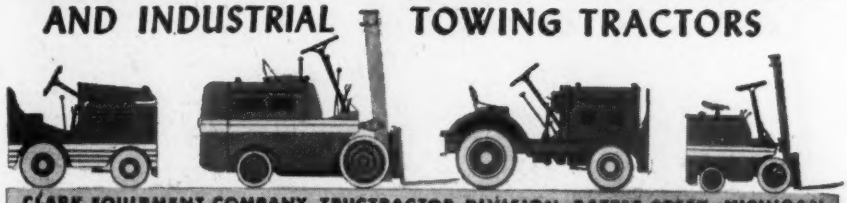

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Structural Orders Slump Sharply in February

New York — Structural bookings in February were 127,911 tons, compared with a revised total of 159,347 tons for January, according to the American Institute of Steel Construction. Combined bookings for the first two months of this year were 27 per cent greater than in the corresponding period last year. Tonnage available for fabrication Mar. 1 was 673,306 tons.

Shipments in February amounted to 135,710 tons, compared with a revised total of 144,315 tons for January. This represents a decrease of 6 per cent for January but an increase of 10 per cent over shipments in February of last year.

Structural Shapes . . .

Structural Shape Prices, Page 129

Boston—Structural steel inquiry is featured by bridge requirements led by 3100 tons, superstructure, Augusta bridge, Kennebeck river, Augusta, Me. Bids on this project close Apr. 14. Other bridge inquiry includes four spans, Gloucester, Mass., Mar. 30, one at Kingston, Mass., Apr. 6; and a two-span welded continuous girder bridge, Woodbridge, Conn., 385 tons, Mar 29.

Private construction, affected by high costs, is developing slowly for this season, although the volume has held up surprisingly well. Largest pending project is 2500 tons, department store, Boston. On most of the smaller inquiries, placing of contracts is influenced by delivery. Although short of plain material and pressing mills for more tonnage, this situation tends to maintain backlogs with shops in this area.

The structural fabricating industry as a whole has a backlog of close to 675,000 tons for fabrication over the next four months.

New York — While structural awards currently are lighter than they were earlier in the month, structural backlogs continue to increase. Some shops are promising five months delivery, as against four months recently, and in the case of at least one large fabricator, indications are that six months delivery will soon be the best that can be promised.

Philadelphia — Structural demand is being sustained in modest volume, with two awards of 600 and 900 tons outstanding. Inquiry includes a sizable tonnage for an apartment in Collinswood, N J., and steel for several other miscellaneous projects. Structural shops are adding slightly to their backlogs, which now average around four months or so. Shapes are in tight supply, with production likely to undergo sharp curtailment before the coal dispute is settled.

Birmingham — Some moderate gain in demand and new inquiries for structural shapes is evident. Some additional public works business is materializing. Reasonably large backlogs are evident on fabricators' books.

Seattle — Largest award for shapes in months, 14,241 tons, went to Bethlehem Pacific Coast Steel Corp. for the Narrows bridge, after a delay of six months. Several small bridge jobs are pending. Local fabricators report little interest at the moment and are handicapped by shortage of steel. With production interruptions in the eastern field, they view the future with increased pessimism.

Tubular Goods . . .

Tubular Goods Prices, Page 129

New York — Deliveries on hot mechanical tubing are extended well into the fall, except in the smaller sizes, ranging 1-1/2 to 2-9/16 inches, nine gage and heavier, which can be had for shipment in August. In cold-drawn mechanical tubes, the larger sizes, ranging up to 4 inches in outside diameter, can be had in late summer; the small sizes, 1/2-inch and under, within a few weeks. Cold-drawn carbon boiler, condenser and super-heated tubes also are available for nearby shipment in the small sizes, with August and September deliveries predominating in the larger sizes.

Most producers of merchant pipe are allocating tonnage on a month-to-month basis, with some mills having recently blanked out one month or so due to operating difficulties. Sellers of oil country pipe, selling on a six months delivery basis, have not opened books for last half, although buyers have been given tentative assurances as to about what they can expect.

Pittsburgh — Steady upward trend in end use applications for fabricated

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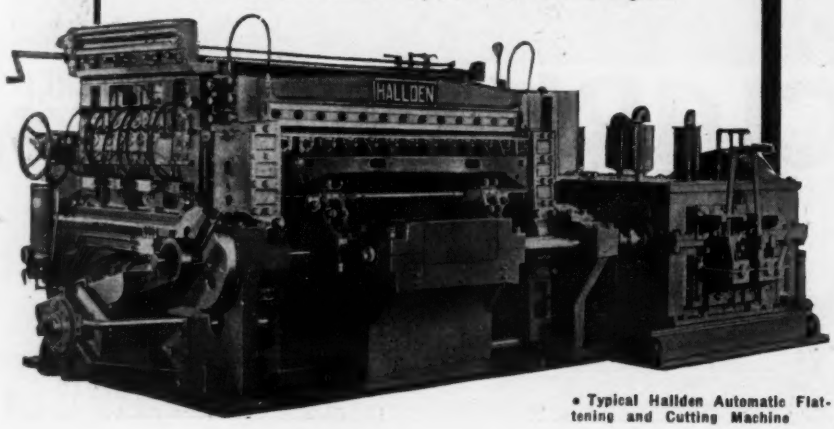

• Typical Hallden Automatic Flattening and Cutting Machine

steel piping and tubular goods reflects a widespread change throughout industry in the use of integrated piping systems as a means of conveying materials, being most pronounced in the continuous processing of food and chemicals. Utilities and paper industries also are very important factors. Supply of seamless or butt weld pipe is expected to remain well below stated requirements for months to come. However, a slight increase in pipe production might result if additional basic steel would be made available as result of tapering in production schedules of other items. There is little prospect of improved supply-demand relationship of most tubing items in near future. There has been some tightening in delivery schedules for both stainless and alloy tubing.

Seattle — Cast iron pipe market is quiet, agencies being severely handicapped by large mill backlogs and delayed deliveries. Competing types have been awarded a number of contracts for these reasons.

Surplus four and six-inch pipe in excess of 10,000 tons from the Canol project in Canada and Alaska is being moved through Skagway, Alaska, to points in the United States, much of it purchased by the L. B. Foster Co., Pittsburgh, for sale and distribution. One ship cargo of 5000 tons is now en route to Houston, Texas, for use in the oil fields. Some of this material is being distributed through Seattle and Tacoma, Wash.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 128

Seattle — Construction activity in this area is swamping rolling mills with an avalanche of small orders for bars. Schools, small industrial plants and public works are consuming a great volume of reinforcing bars and mills are unable to take all the business offered. Major objective is to speed deliveries and reduce backlogs. Northwest Steel Rolling Mills, Seattle, is rolling only four days weekly, the furnaces being unable to supply sufficient ingots for continuous operations, due to poor and bulky scrap necessitating twice the number of normal charges.

Several Groups Organize Scrap Colection Drives

Railroads, manufacturers and civic groups have conducted this month or are organizing scrap collection drives to give a boost to steel production. The Association of American Railroads has designated the week beginning Apr. 5 as "Railroad Scrap Collection Week." Most railroads have had a continuing program on the collection of scrap metal for many years but they have redoubled their efforts since the beginning of 1947 because of the urgent need for steel.

Union Pacific, for instance, has turned back to steel companies during the last 14 months 268,347 gross tons of scrap, including the worn-out hulks of 357 locomotives and 868 steel cars.

In Onondaga county, New York, an intensive scrap collection campaign was conducted recently by an Emergency Scrap Metal Committee, organized by the mayor of Syracuse and supported by a large number of civic groups. Its in-plant program yielded millions of pounds of scrap above normal output, while its house-to-house and rural collections yielded additional large tonnages.

Pig Iron Output Declines 355,903 tons in February

Production of pig iron declined last month with blast furnaces operating at 90.6 per cent of capacity compared with 90.9 per cent in January, according to the American Iron & Steel Institute. February production consisted of 4,779,857 tons of pig iron and 58,175 tons of ferromanganese and spiegeleisen, or a total of 4,838,032 tons, compared with January production of 5,126,587 tons of pig iron and 67,348 tons of ferromanganese and spiegeleisen, or a total of 5,193,935 tons. Combined output was down 355,903 tons for the month. Production for the first two months aggregated 10,033,790 tons, or 90.8 per cent of capacity.

Distribution of production by districts was reported as follows for February: Pittsburgh-Youngstown, 1,885,712 tons; Chicago, 972,352 tons; eastern, 934,174 tons; Cleveland-Detroit, 469,503 tons; southern, 377,364 tons; and western, 198,927.

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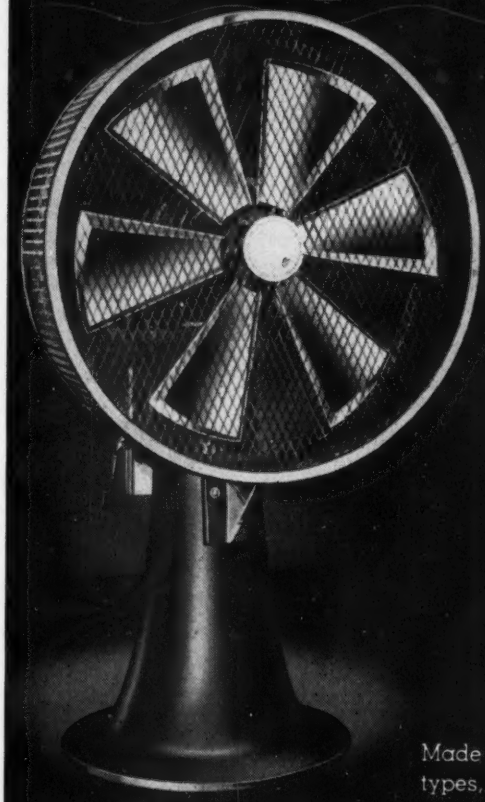

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Pig Iron . . .

Further supply shrinkage expected if allocations are extended. Output dropping

Pig Iron Prices, Page 130

Pittsburgh — Pig iron demand-supply relationship probably will become more distorted over coming months if the voluntary allocation of steel and iron for the railroad construction program as now tentatively determined is officially put into operation. Most trade authorities contend allocation to certain key industries cannot be carried out on a piecemeal basis without resulting in a serious iron shortage in many other industries. Some railroad interests also are reported to be against such a program because of the prospect they would be forced to obtain much of their requirements from other than their usual source of supply. A substantial reduction in blast furnace operations is indicated by early this week should the coal strike continue. Two companies in the greater Pittsburgh area started curtailing pig iron output last week, while other interests plan to maintain full production schedules through Apr. 1.

Boston—Due to continued limitations in pig iron supply, melters no longer hold strictly to specifications as to silicon and other elements. They take what they can get and attempt to adjust melting practice accordingly. There is no improvement in tonnage in sight with the Everett furnace the backbone of supply. This volume has to be spread thin and few melters are able to improve the ratio of iron in melts. When and if more iron is available, the raising of this ratio will be the first result. Basic users are operating with meager inventories, although iron coming from Buffalo is less costly where the price is tied to steel scrap prices.

New York — Pig iron shipments in the New York area are declining rapidly, although shortage of coke is proving to be an even greater handicap to foundry operations. Pig iron sellers generally look for conditions to become worse before the coal dispute is adjusted.

Philadelphia — Pig iron production has begun to decline, as a result of the coal stoppages, with the probability that it will sink substantially lower before it improves. Open hearth production has dipped and foundry operations have declined, with some foundries now down completely, not only because of lack of iron but of coke as well. One of the leading oven coke producers in the district has suspended all shipments of foundry coke to the merchant trade, so as to conserve supplies for its own needs, while another, which has been shipping on a limited basis for the past few months, has further curtailed deliveries of foundry coke by 25 per cent.

Swedeland, Pa., iron producer is entering the new week with full production, although the smaller of its two furnaces will probably be banked before the week is over should there be no improvement in the coal outlook.

Buffalo—While 15 of the area's 16 stacks remain active, total tonnage figures have been slashed considerably. Bethlehem Steel Co.'s Lackawanna plant cut the wind on its six blast furnaces which resulted in a tonnage loss equivalent to the production of two units. Bethlehem pointed out that none of the furnaces were banked. The action was to conserve coal supplies as a result of the miners' strike.

Coke oven operations were reduced 25 per cent.

Actually, the Bethlehem move lowered the area's pig iron rate to 81 per cent of capacity, off 13 points. Bethlehem's furnaces were on basic iron for open hearth furnaces. However, a leading merchant iron producer is expected to pare operations within the week if the coal strike continues. Such a move would further aggravate an already tight merchant iron market.

Tonnage has been cut also on the Tonawanda Iron Corp.'s stack which is scheduled to go down soon for a relining job. In line with additional demand, interest was shown in the acquisition of the idle Otis Elevator foundry here by the newly-formed Buffalo Stainless Casting Corp.

Cleveland — Voluntary allocations under the railroad freight car building program were seen as having little disruptive effect on pig iron distribution in this district since the program's requirements coincide largely with present distribution pattern. Iron producers here had not cut back output last week, but one furnace may be blown out for repairs sooner than

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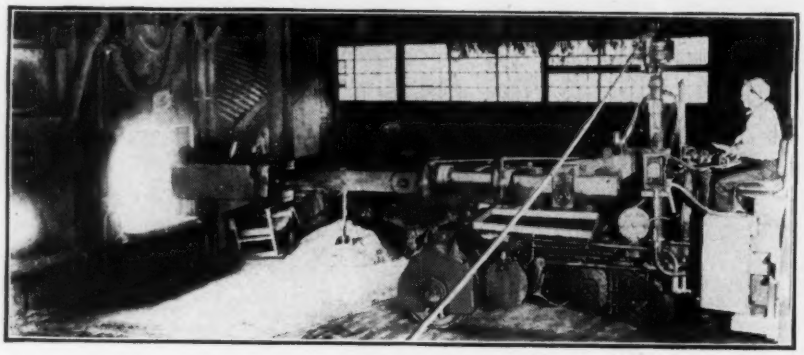

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had been planned originally. Heavy demand continues unabated. Prices were unchanged last week.

Chicago — Cessation in coal mining has foundries worrying concerning supplies of pig iron and coke. Supply of both materials has been uncomfortable for so long a critical condition could develop in short order. So far, shipments have not been affected and suppliers expect to be able to meet their March commitments; beyond that, the picture is obscure. Present indications are that there will be no bankings of blast furnaces here because of fuel shortage until after Apr. 1. Cokemakers have sufficient inventories of coal to carry them beyond that date. If the coal mine walkout continues into April, severe curtailments in both pig iron and cokemaking are to be expected. Of the district's 41 blast furnaces, 38 still are active.

Cincinnati — A slackening in shipments of pig iron, because of stoppage in coal mines, is already apparent, with a depressing effect on the district foundry melt. The pinch in supplies of pig iron and coke may force some early suspensions in the melt, even though there is an easier situation in scrap.

Birmingham — Adding to the woes of pig iron users of the district, Woodward Iron Co. has taken off a merchant blast furnace at Woodward because of the coal strike. Sloss-Sheffield Steel & Iron Co. operations are on a day-to-day basis in view of the uncertainty of coal.

St. Louis—Pig iron production here remains at capacity, but the coal strike has pulled coke ovens down 15 to 20 per cent. Missouri-Illinois Furnaces at Alton is getting a little coal from southern Illinois, West Virginia and Kentucky. Coke inventories are 7 to 10 days, and the coal coming in will allow blast furnace operations to continue about one month. Prospects are good of obtaining extra fill-in coke from the Minnesota plant. One foundry iron furnace was expected to be down two days last week for minor repairs. Pig iron demand here is unabating from outside sources. Local users cannot obtain all they want, but generally are not suffering unduly from shortages.

Seattle — Pig iron and coke situation, already critical, will be materially worsened if the coal strike continues. For several months local foundries have been receiving occasional carloads of pig, averaging three or four a month against a normal demand of 30 to 40. Utah pig iron has been going into steel and that area is expected to feel the effect of the strike immediately. Coke is also tight and the situation in the east will shut off shipments from that field. Local consumers expect they will have to depend on shipments from the Crows Nest field, Canada, but supplies are inadequate, shipments uncertain.

Warehouse . . .

Warehouse Prices, Page 131

New York—Steel deliveries to warehouses covering structurals, plates, bars and flat-rolled are sagging with inventories in these products badly depleted. Distributors are unable to place additional tonnage against allocations which in some cases have been reduced. This is especially true in the case of hot-rolled sheets and plates. While alloy deliveries have extended two months or more, improvement in demand for these grades with warehouses is not pronounced. Distributors' structural quotas for second quarter have been cut up to 18 per cent in some instances. In bars, flats are the tightest size.

Pittsburgh — Steel distributors' inventories of carbon steel items remain badly depleted, particularly in sheets, plates, structurals, small size bars, pipe and wire items. Stocks of stainless, cold-finished bars and alloys are in adequate supply to meet current demands, although mill deliveries on alloys and cold-finished items have lengthened in recent weeks. With few exceptions, warehouses have been successful in furnishing sufficient steel to their numerous customers for maintenance of 70 to 80 per cent capacity operations. Some interests claim they have taken on more new customers in 1947 than any previous year, reflecting in part, moderate increase in mill shipments throughout the period.

Philadelphia — Jobbers are winding up what they believe will be one of the best months of this year. Sales on a daily basis have not been much, if any, heavier than last month, but more days and fewer holidays will bring the total up substantially. Walkout at the coal mines is not expected to be much of a factor this month, but should it continue on for any length of time it would undoubtedly

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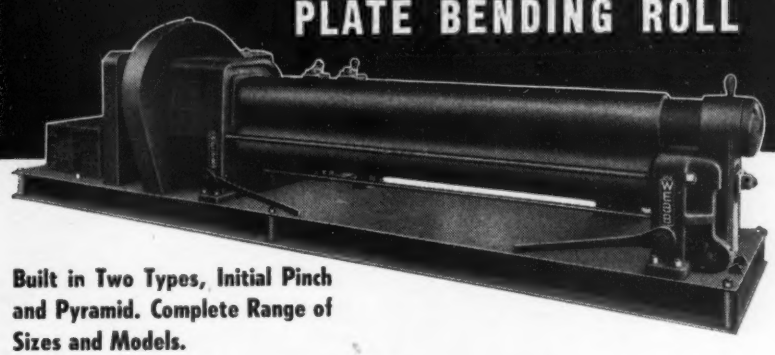

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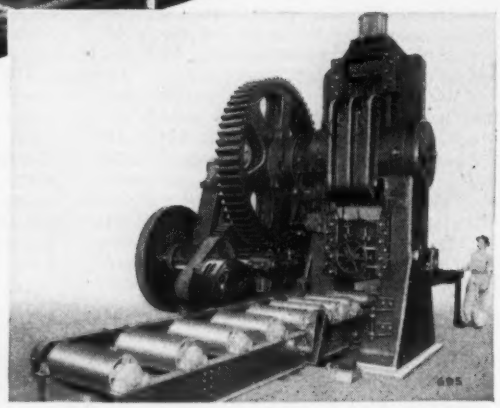

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have an influence, and probably first toward increasing volume before reducing it.

Chicago — Warehouses are unable to detect any diminution in flat-rolled steel demand. Inventories are depleted and unbalanced. Stocks of cold-finished bars have improved somewhat. Carbon bars and structurals, however, remain as tight as ever. Some warehouses see increasing evidence that there may be some lessening in overall steel demand late in the year.

Cleveland — Additional demand for cold-finished carbon bars is being made on warehouses, with the result deliveries are extending. Particularly in demand are flats 1/2-in. and lighter.

Pressure for light plates and sheets continues relentlessly. Also in heavy demand are bar size shapes, angles, channels and all other products requiring fabrication.

Warehouse industry representatives have been invited to a meeting in Washington about Apr. 21 with Office of Industry Co-operation officials to discuss possibility of developing allocations program to aid small consumers who depend on warehouses for steel.

Cincinnati — Steel jobbers report mill shipments have been in smaller volume recently. Sheets, plates and most structural items are so scarce that sales total for March may slip. Seasonal needs are appearing to swell the booming customer demand.

Seattle — Jobbing houses report a steady demand for all steel items, the volume being equal to the best months of the war period. Materials are sold as quickly as they are received so that inventories continue depleted and badly broken. Shortages of sheets, plates, reinforcing, wire and nails are as acute as they have been for months. Alloys, cold-finished and stainless steels are somewhat easier.

Ferroalloys . . .

Ferroalloy Prices, Page 131

New York—New Jersey Zinc Co. has advanced spiegeleisen prices $5 a ton, effective March 22. As a result, 19 to 21 per cent material is now holding at $52, Palmerton, Pa., per gross ton in carlots. This is the first change since Aug 6, 1947, when the market on this grade was increased $3 a ton to $47.

Further increases in costs, particularly with respect to coke, lie behind this latest advance. Early this year the Palmerton producer lost its major source of oven coke as a result of the purchase of a coke oven property by a western Pennsylvania steel producer.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 130

Pittsburgh — Some small foundries were forced to curtail production schedules last week due to rapidly depleting coke inventories resulting from almost complete cessation of beehive coke output in the Connellsville district. Should the coal mine walkout continue, it appears inevitable the larger foundry interests will have to begin retarding operations sometime this week. Curtailment in steel production resulting from reduced oven foundry coke output is not expected to be initiated until after Apr. 1.

Scrap . . .

Increase percentage of scrap in melts to stretch pig iron supplies

Scrap Prices, Page 134

Cleveland — Steelmakers and foundries showed additional interest in scrap last week as they increased percentage of scrap in melts to stretch pig iron supplies. No changes were reflected in prices, for good weather is improving the scrap flow. Foundries are calling particularly for rails. With steel production at high rates and with scrap consumption increased to stretch hot metal supplies as the seriousness of the miners' strike intensified, the volume of scrap moving in March has been pushed to high levels, one broker reporting the month will be one of the biggest on record.

With alloy steel production up considerably, additional demand will ensue for scrap. However, the increased flow of scrap is expected to ameliorate any upward price pressure resulting from increased demand from electric furnace operators.

Military preparedness measures are not expected to have any immediate buoyant effect on scrap prices, inasmuch as steel output could not go much higher than recent near-capacity levels. Furthermore, government price controls likely would be reinstituted, thereby thwarting any attempts to push prices up. However, trade consensus is that prices higher than those prevailing in late 1947 would not bring out any more scrap.

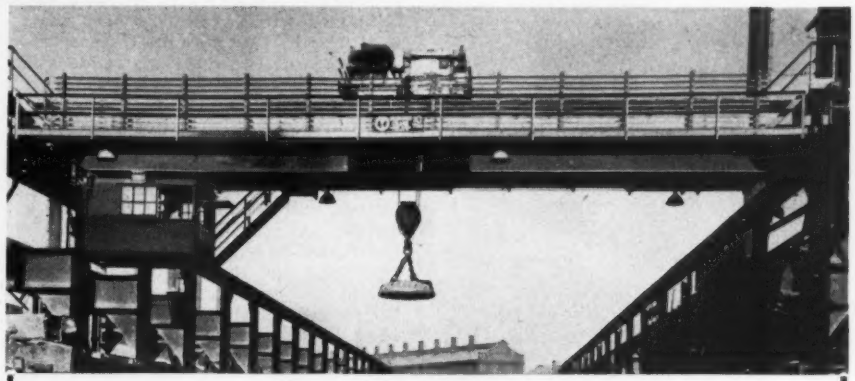
Republic Steel Corp. is supplementing its scrap supply with two shiploads of scrap from Europe, the first shipment of 3700 tons having arrived last week at Philadelphia. Second shipload is enroute to the U. S.

Buffalo—Withdrawal of eight open hearths at Bethlehem Steel Co's Lackawanna plant had no immediate effect on the scrap market. Consumers were still urging prompt shipments on old orders which were placed at the pricing formula. The pull on scrap by the mill curtailing operations was expected to be about the same as a result of a corresponding slash of 33 1/3 per cent in pig iron output. In addition, mills' stockpiles are reported at low. Some easement in prices might develop if the coal strike continues when the navigation season moves into full swing. However, talk along this line is offset at least partially by indications that the navigation season will be slow in getting under way if coal is not available. Boland & Cornelius canceled one of its trips during the week because of the coal situation.

Prices in general appear to have leveled off at prevailing ranges, which usually place the formula prices at the inside of the spreads.

New York — Brokers' buying prices were unchanged last week. Steel scrap is moving freely, although there is a falling off in the cast grades, due to the fact that district foundries are having to drastically curtail operations because of lack of coke. Several foundries have virtually suspended operations, with others likely to follow if the coal dispute is not settled shortly.

Philadelphia — Scrap prices are un-



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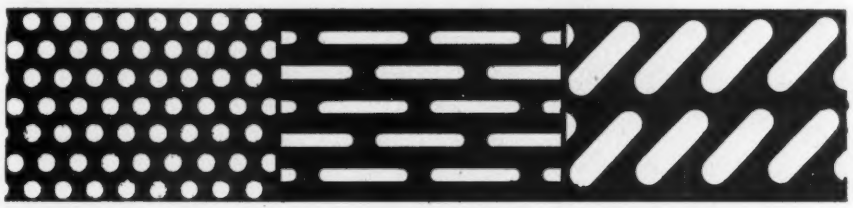

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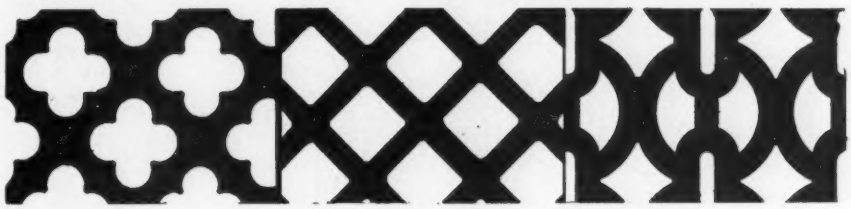

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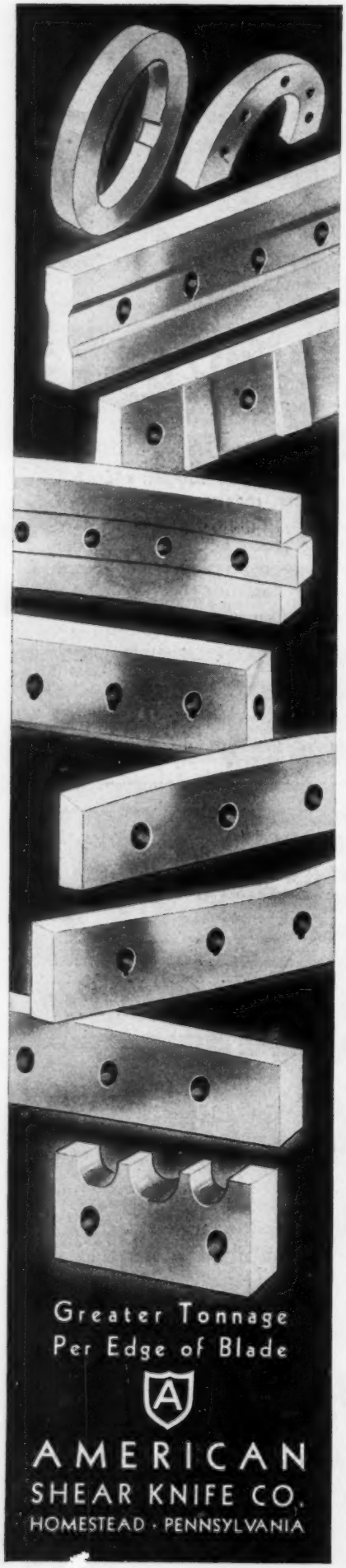

changed, with a slightly firmer undertone in the steelmaking grades. Tonnage is coming out moderately well, and consumers are still taking in shipments freely, nothwithstanding curtailment in ingot production, as a result of the coal dispute. However, should this dispute be prolonged for another couple of weeks or so, buyers will probably cut down on receipts. At least some interests figure their stocks will be in fair shape by that time and that they can therefore afford to wait to see what happens to prices. With spring now at hand they do not look for an increase in prices and think possibly there might be a reduction. In cast scrap the situation is mixed. Some foundries, now handicapped by a sharp reduction in coke as well as pig iron receipts, are unable to maintain even the restricted operations of recent weeks and, therefore, are not pressing as hard for cast scrap. Others are still able to carry on for the present and are augmenting scrap purchases to make up for the further shrinkage in pig iron supply. However, cast prices for the moment are fairly steady. Some foundries have recently started using a mixture of anthracite coal in an effort to bolster operations.

Boston—Cast scrap prices have eased more and steel scrap prices are hovering around the formula. Movement of the latter is slightly heavier. Consumers of cast are also more concerned as to quality and are tightening up inspection. Short steel for foundry melting is around $35 to $37. Substantial volume of turnings and borings is involved in recriprocal deals and relatively little volume is reaching the market.

Pittsburgh—More open weather has permitted substantial increase in scrap collection and segration efforts, resulting in some producers augmenting inventories. The somewhat improved scrap supply outlook in face of threat to steelmaking operations has resulted in most major consumers adopting a "wait and see" attitude before making additional large tonnage commitments. Considerable scrap is said to be still outstanding on old orders at formula price levels. To date there has been no evidence of increased scrap consumption as result of steel producers attempting to offset reduction in coke output due to coal strike. Talk of renewed activity in purchasing of war materials has undoubtedly had a stiffening effect on prices of many commodities, including scrap. Cast scrap shortage appears to be growing more acute reflecting in part increased use to offset scarcity of merchant pig iron. Bulk of No. 1 cupola tonnage is said to be moving in price range of $65 to $66, up $1 from previous level due to little tonnage of cast scrap moving and intermittent purchasing. Wide price flunctuations have been frequently noted.

Chicago — A somewhat firmer tone is observed in the scrap market here despite the fact mills continue to withhold major purchasing. As evidence of the increased strength is disappearance of the $2 differential between factory and dealer material which had prevailed for several weeks. Most mills still display little or no interest in dealer scrap but some tonnage has moved at the same level as factory grades and it is obvious that none can be bought at the $37.50 price. Steelmaking operations are being maintained at a high rate, in fact have increased slightly but scaling down which may be necessary after Apr. 1 if the coal walkout continues may postpone new action on scrap acquisition.

Cincinnati—Scrap is moving steadily at established prices even though there is a feeling of uncertainty in the market. Foundries are buying conservatively despite fair stocks, as they face curtailment in melt through possible lack of coke and pig iron, due to the walkout of coal miners. Mills are taking in scrap at the formula, and there is little or no evidence of dealers' holding of tonnage for speculation.

Birmingham — Scrap activity continues relatively light. Quotations vary and are by no means uniform, although a general firming is quite evident, according to market sources.

St. Louis — Scrap prices are holding firm, with opinions differing as to which way they will go if the coal strike continues Some dealers feel scrap will go up in response to greater demand when supplies of pig iron fall off. They say cast grades already are bulging a trifle from pig shortage expectations. But others believe the strike will be settled soon or continue until most mills shut down, eliminating the demand for both pig and scrap. Local strike effect on mills will not be serious, since nearly all use, or are equipped to use, gas. Current mild weather also will prevent the curtailment of gas to industrial users which occurred in the previous coal shutdown. Scrap shipments are off a trifle due to widespread rains. Nevertheless melters are continuing to build stocks, the majority now having around 30 days' supply. Railroad offerings from the Frisco and Katy roads this week were expected to exceed 5000 tons.

Seattle—Foundries are handicapped by the shortage of pig but report that current high price levels have brought out increased quantities of cast iron scrap. The pig situation is throwing pressure on scrap which is now being used in a much higher ratio than under normal conditions. Eastern buyers appear less active in this market. Cast iron continues firm at $40.

Increased receipts have improved the steel scrap situation slightly, attributed largely to improved weather in the country and the current high price, which is now $26 gross, fob mill. It is expected that some inventories may now be accumulated, stocks having been exhausted for months.

Bids will be received by the Maritime Commission Apr. 13 for sale of 21 LST's in Washington and 23 in California which, when dismantled, will add materially to the stocks of scrap available for the mills.

Washington—Consumption of purchased scrap during December increased 2 per cent over November to bring the year's total to 26,066,000 gross tons, an all-time record, Bureau of Mines, Department of the Interior, reports.

Steel scrap consumed in steel furnaces during the month totaled 3,501,000 gross tons, compared with 3,460,000 tons in November. Consumption of scrap in gray iron foundry cupolas increased 6 per cent to 842,000 tons.

Rails, Cars . . .

Track Material Prices, Page 129

New York — Domestic freight car awards this month should well exceed the totals for the preceding two months of this year. Two orders alone, in fact, 9200 for the Southern Pacific and 3050 for the Burlington, exceed, respectively, the 10,698 placed in February and 9213 in January.

New inquiry, however, is rather light and some car builders anticipate a lull in demand for a while. Meanwhile, steel producers are increasing their shipments to car builders under the voluntary allocation program, at the expense in various instances of some of their other customers. This is particularly true in plates.

Railroads had 121,936 new freight cars on order as of Mar. 1, an increase of nearly 2000 over a month earlier, according to the Association of American Railroads. Class 1 roads also had 1596 locomotives on order Mar. 1, or more than twice the 680 on order on the same date last year. These roads put 15,518 new freight cars on their lines in January and February compared with 4232 in the same period last year.

New York — Pennsylvania railroad has awarded 114 diesel-electric locomotives and 2300 freight cars, the latter to its shops at Altoona, Pa. The locomotives were placed as follows: 8 road freight diesels, to Electromotive Division, General Motors Corp., La Grange, Ill., and 6 to Fairbanks-Morse Co., Chicago; 54 diesel switchers to Baldwin Locomotive Works, Eddystone, Pa.; 20 to American Locomotive Co., New York; 14 to Electro-Motive Division, General Motors Corp., and 12 to Fairbanks, Morse Co. The freight cars comprise 2000 70-ton gondolas and 300 covered hoppers.

Pittsburgh—Second quarter monthly steel deliveries under the railroad allocation program appear to have been established at about 252,000 tons. This overall monthly tonnage includes estimated requirements for maintenance and repairs, and is composed primarily of plates and structurals. A number of details as to manner of steel distribution are still undecided. Some railroads balked at having to obtain steel from other than regular sources, which in some instances involved substantially higher prices than prevailing on bulk of tonnage moving, as well as higher freight rates. There is some doubt whether March freight car output will reach the 10,000 monthly goal as previously predicted by most trade authorities.

Seattle — Bethlehem Pacific Coast Steel Corp. is rolling several thousand tons of tie plates, for both domestic and foreign customers, at the local plant. Additional orders for this material are expected shortly.

Canada . . .

Toronto, Ont. — While pig iron output in Canada declined in January, production of ferroalloys and steel ingots and castings reached the highest level in more than a year.

Pig iron production in January amounted to 160,042 net tons, or at an average rate of 69.9 per cent of capacity compared with an average of 72.4 per cent for December. January

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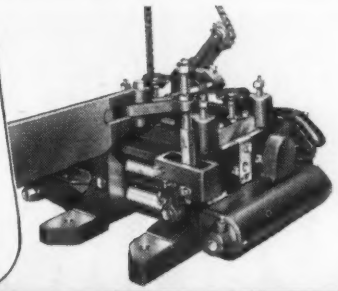

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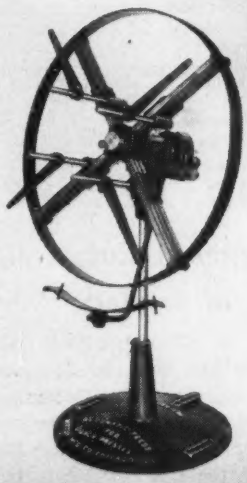

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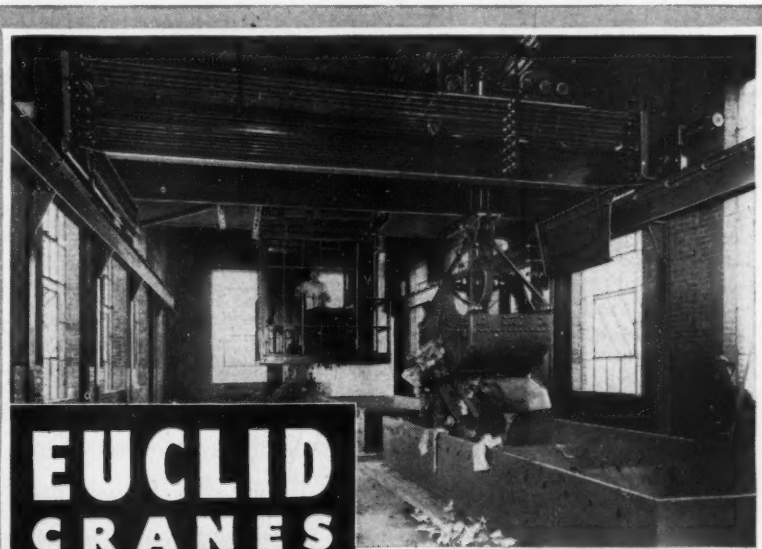

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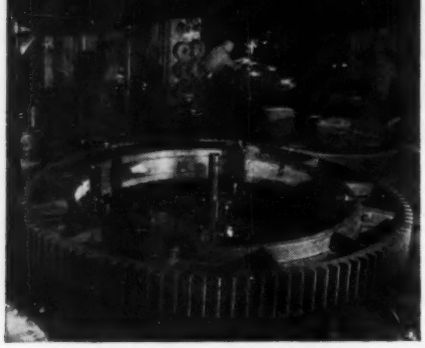

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output included 134,110 tons of basic iron, 19,517 tons of foundry iron, and 6415 tons of malleable iron. Production of ferroalloys in January amounted to 17,125 net tons.

Charges to blast furnaces in January included: 316,842 tons, iron ore; 18,268 tons, mill cinder, scale, sinter, etc.; 5101 tons, scrap.

Steel ingots and castings output in January totaled 256,726 tons, which was 86.8 per cent of capacity compared with 84.5 per cent in December. Charges to steel furnaces in January included: 127,021 tons of pig iron; 75,745 tons of scrap of consumers' own make; 73,778 tons of purchased scrap.

Following are comparative production figures in net tons:

	Steel Ingots Castings	Pig Iron	Ferro-alloys
Jan., 1948	257,726	160,042	17,125
Dec., 1947	249,769	165,551	10,888
Jan., 1947	249,798	177,313	9,644

Steel Shipment Cut Reported in January

Shipments of steel products declined 202,598 net tons in January to 5,410,438 tons from the December total of 5,613,036 tons, but showed an increase of 380,430 tons over the January, 1947, total, according to the American Iron & Steel Institute.

The revised total for 1947 is 63,179,523 tons, or a monthly average of 5,264,960 tons.

Although shipments were smaller in January, those of the following products were larger and, hence, accounted for a larger percentage of the total than in the preceding month: Hot and cold-rolled sheets, cold-rolled strip, hot-rolled bars, cold-finished bars, butt weld pipe, electric weld pipe, seamless tubing, wire rods, nails and staples, woven wire fence.

Shipments which showed substantial declines in January included the following: Semifinished, heavy structural shapes, plates, standard rails, track supplies, tin and terne plate.

Details are shown in the table on page 44.

Stockpiles of Iron Ore At Critically Low Levels

(*Concluded from Page* 44)

ance normally handle only occasional cargoes of ore. The capacity of the United States lake fleet is not expected to meet the extraordinary shipping requirements for ore (estimated at 86 million tons) and other bulk cargo in 1948. Lake shippers supported, therefore, the bill which authorizes vessels of Canadian registry to transport ore between United States ports on the Great Lakes during the 1948 season.

Setting of prices on Lake Superior iron ore for the 1948 season is being delayed because of present uncertainties in a number of cost factors, such as ore miners' wages and lake transportation rates. However, demand for ore is so great that shipments will be started as soon as weather permits, even though 1948 prices may not have been determined.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

14,241 tons, the Narrows bridge, Washington state, to Bethlehem Pacific Coast Steel Corp., San Francisco.

1350 tons, apartment, 76th St. and 5th Ave., New York, to Harris Structural Steel Co., that city.

6500 tons, superstructure, East bridge, 14th St., U. S. Route 1, over Potomac river, Washington, to Bethlehem Steel Co.

900 tons, warehouse and office, American Stores Co., Forty Forth, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

600 tons, Reading Railroad bridge, Lycoming creek, Newberry, Pa., to American Bridge Co.

450 tons, state bridge work, Camden county, New Jersey, through F. A. Canuso & Son, general contractor, Camden, N. J., to Bethlehem Steel Co.

280 tons, addition to Public School No. 133, 248th and 249th St., between 85th and 86th Ave., Bellerose, N. Y., to Grand Iron Works, Inc., New York.

110 tons, office building addition, 104-110 John St., New York, to Grand Iron Works Inc., that city.

STRUCTURAL STEEL PENDING

7000 tons, seven 17-story apartments, Governor Smith housing development, lower East Side, Manhattan, New York, bids closed by the Municipal Housing Administration; previously noted as involving an unstated tonnage; Bethlehem Steel Co., low at $1,695,000.

3100 tons, superstructure, Augusta bridge, Kennebec river, Augusta, Me.; bids Apr. 14, Maine State Highway Commission, Augusta; project also takes 4354 feet, wrought iron rail.

580 tons, two Dupont projects, Newbridge, Del., involving 150 and 430 tons; bids Mar. 29.

500 tons, warehouse, Robert E. Lamb, Philadelphia; bids Mar. 31.

325 tons, four-plate girder spans, Pennsylvania Railroad, Holmsville, O.; bids Apr. 5.

225 tons, railroad bridge and highway underpass, Ware, Mass.; bids Mar. 30, State Department of Public Works, Boston.

215 tons, Clackamas river bridge, Oregon, to Port Construction Co., Port Angeles, Wash., by Public Roads Administration; low bid $108,924.

183 tons, state bridge work, Lawrence and Butler counties, Pennsylvania; bids Apr. 9.

150 tons, Public Roads bridge, Humptulips river, Washington state; David Nygren, Seattle, low, $79,635.

Unstated tonnage, Sylvester Lowery apartment, Collinswood, N. J.; bids Mar. 31.

Unstated, addition to main public library, Seattle; bids Apr. 6; estimated cost $700,000.

Unstated, two truss spans, Puyallup river; bids in at Tacoma, Wash., Mar. 22.

REINFORCING BARS . . .

REINFORCING BARS PENDING

1300 tons, superstructure, Astoria Houses, Queens, New York; Corbetta Construction Co., 220 East 42nd St., New York, low bidder.

850 tons, veterans hospital, Spokane, Wash., Robert E. McKee, Los Angeles, apparently low, $3,624,100.

354 tons, state highway work, Lawrence and

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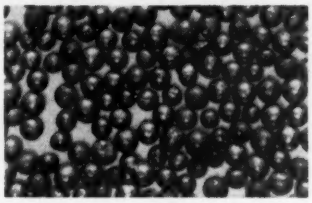

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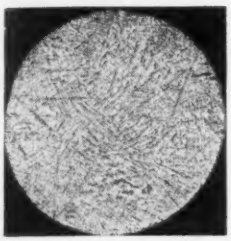

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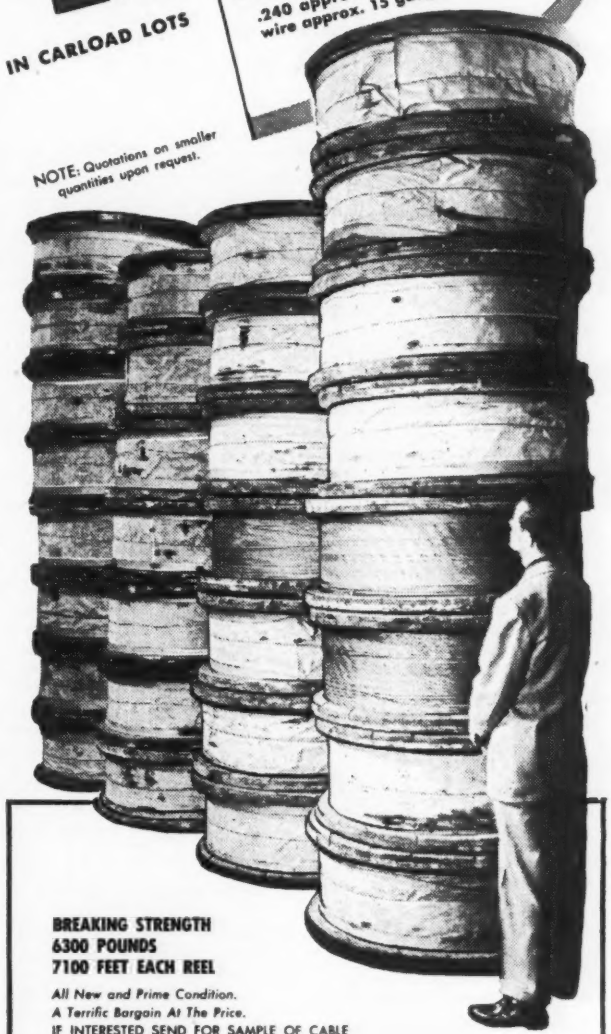

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Butler counties, Pennsylvania; bids Apr. 9.

300 tons, addition to cold storage plant, Port of Tacoma, Wash.; bids rejected, new bids Apr. 6.

225 tons, highway, Charlestown, R. I.; bids Mar. 31, Providence, R. I.

PLATES . . .

PLATES PLACED

150 tons, standpipe, water department, West Bridgewater, Mass., to Chicago Bridge & Iron Co., Chicago.

100 tons or more, elevated steel water tank, veterans hospital, Baltimore, to Pittsburgh-Des Moines Steel Co., New York; $66,500.

Unstated tonnage, four welded steel car floats, Brooklyn Eastern District Terminal, Brooklyn, to Bethlehem Steel Co.

PLATES PENDING

9000 tons, (tie plates); bids in to Alaska Railroad.

6000 tons, additional storage capacity, 61 million gallons, Socony-Vacuum Oil Co., New York, in 25 cities in New York state and New England.

3815 tons, black and galvanized hull steel, Navy Department; bids Mar. 29, deliveries east and west yards; also 150 tons, floor plate.

130 tons, standpipe, water department, Sandwich, Mass.

PIPE . . .

CAST IRON PIPE PENDING

848 tons, the Narrows bridge, Washington state, to Bethlehem Pacific Coast Steel Corp., San Francisco.

275 tons, miscellaneous sizes; bids in at Seattle; H. G. Purcell, Seattle, low for U. S. Pipe & Foundry Co., Burlington, N. J.

Unstated, 2650 feet 4 and 6 inch; bids to King county district No. 43, Apr. 2, Seattle, with alternatives; Parker & Hill, Seattle, engineers.

RAILS, CARS . . .

RAILROAD CARS PLACED

Carbon County Railroad, 300 seventy-ton hopper cars, to Pullman-Standard Car Mfg. Co.

Chicago, Burlington & Quincy, 3050 freight cars, to own shops; list includes 1000 fifty-ton box cars, 500 seventy-ton hopper cars, 150 seventy-ton covered hopper cars, 500 forty-ton stock cars, 300 fifty-ton flat cars, 200 16,000-gallon tank cars, 250 seventy-ton ballast cars, 100 fifty-ton parts cars and 50 seventy-ton mill type gondola cars.

Delaware & Hudson, 150 fifty-ton steel hopper cars and 150 forty-ton steel box cars, to its Oneonta, N. Y., shop.

Illinois Terminal, 200 fifty-ton box cars, to American Car & Foundry Co.

Missouri Pacific, 55 steel caboose cars, to its own shops.

Northern Pacific, 500 fifty-ton box cars and 200 fifty-ton flat cars, to its Brainerd, Minn., shop.

Pennsylvania, 2000 seventy-ton gondolas and 300 covered hoppers, to own shops, Altoona, Pa.

St. Louis & O'Fallon, 30 fifty-ton hopper cars, to St. Louis Refrigerator Car Co., St. Louis.

St. Louis Refrigerator Car Co., 100 forty-ton refrigerator cars, to own shops.

Wabash, 200 fifty-five-ton hopper cars, contemplated for erection in its own shops.

LOCOMOTIVES PLACED

Pennsylvania, 114 diesel-electric locomotives, including 8 road freight units to Electro-Motive Division, General Motors Corp., La Grange, Ill. and 6 to Fairbanks, Morse & Co., Chicago; 54 diesel switchers to Baldwin Locomotive Works, Eddystone, Pa., 20 to American Locomotive Co., New York, 14 to Electro-Motive Division, General Motors Corp., and 12 to Fairbanks, Morse & Co.

CONSTRUCTION AND ENTERPRISE

ALABAMA

BIRMINGHAM—American Rock Wool Corp., c/o contractor, has awarded a $100,000 contract to Rust Engineering Co., Liberty National Life Bldg., for construction of a plant.

ILLINOIS

CHICAGO—Howard Corp., 416 S. Talman St., has awarded a $60,000 contract to Farstad & Narbo, 4816 Hutchinson St., for construction of a foundry.

INDIANA

TERRE HAUTE, IND.—Commercial Solvents Corp., H. E. Perry, president, 1331 S. First St., plans a $2 million project to include a research building, high pressure pilot plant, bacteriological pilot plant and pharmacological laboratory.

UNION CITY, IND.—Sedan Body Co., has awarded a $75,000 contract to Austin Co., 16112 Euclid Ave., Cleveland, for design and construction of a 2-story factory.

MARYLAND

ROSSVILLE, MD. — Baltimore Brick Co., George C. Warehime, secretary, 3661 E. Monument St., Baltimore, will build a tunnel kiln building.

MICHIGAN

DETROIT—Grand Tool & Engineering Co., 6460 Benham, has been formed by John O. Heugley with a capital of $100,000 to fabricate and manufacture tools, dies and machinery.

DETROIT—Hydro Mfg. Co., 3046 E. Outer Dr., has been formed by Milton Marshall with a capital of $250,000 as a general manufacturing business.

DETROIT—Neco-Filet Mfg. Co., 18695 Birchcrest Dr., has been formed by Edward M. May with a capital of $150,000 as a machine shop business.

DETROIT—American Colloids Co., 627 Buhl Bldg., has been formed by Kenneth R. Blake with a capital of $200,000 to manufacture implements and machinery.

DETROIT—Art Tool & Die Co., 511 Lieb, has been formed by Woodward L. Derrohn with a capital of $150,000 to manufacture and sell tools, dies, jigs and fixtures.

DETROIT—Morton Gregory Corp., 2003 Fisher Bldg., has been formed by Vernon C. Abbott with a capital of $250,000 to manufacture and sell electrical materials.

FLINT, MICH.—Royal Devices Inc., 703 E. Eighth St., has been formed by J. A. Coletti with a capital of $100,000 to manufacture and sell industrial tools.

GRAND RAPIDS, MICH.—Kortz Blower Mfg. Corp., 334 Federal Square Bldg., has been formed by Anthony T. Kortz with a capital of $100,000 to manufacture and sell ventilating and heating equipment.

GRAND RAPIDS, MICH.—Leisur-Maid Mfg. Corp., 908 Michigan National Bank Bldg., has been formed by Delbert H. Clark with a capital of $150,000 as a machine tool, die and stamping business.

NEW YORK

BUFFALO—Trico Products Corp., 817 Washington St., plans to build a manufacturing plant and three additions. Warwick R. Jewel, 33 Frontenac Ave., is the architect.

OHIO

BEDFORD, O.—Pesco Products Co., R. J. Minshall, president, 1610 Euclid Ave., Cleveland, has awarded a $100,000 contract to Sam W. Emerson Co., 1836 Euclid Ave., Cleveland, for construction of a laboratory, first of a group of buildings, on N. Miles Ave. between Richmond and Green Rds.

CLEVELAND—Diamond Alkali Co. has postponed building its administration and research plant here because of high costs. Project was to have cost about $2,500,000.

CLEVELAND—Cleveland Graphite Bronze Co., 17000 St. Clair Ave., has allotted $800,000 for additional plant improvements in 1948.

CLEVELAND—Industrial Parts Co., 1360 W. Ninth St., will spend about $100,000 on a plant alteration program.

CLEVELAND—Baker-Raulang Co. is building a $100,000 addition to the factory at its Baker Body Division, 8200 Baker Ave.

CLEVELAND — Glidden Co., 11001 Madison Ave., has awarded an $80,000 contract to J. C. F. Shafer Co., Caxton Bldg., for a 2-story addition to a paint plant.

CLEVELAND — Dickey Grabler Co., metal stampings firm, 10226 Madison Ave., W. J. Primrose, vice president, plans to build a $50,000 factory addition.

LOGAN, O.—General Electric Co., c/o E. A. Howard, manager of Glass Manufacturing Division, Nela Park, Cleveland, will begin construction in April on a glass plant here. Building will cost $1,250,000 and equipment $750,000.

SANDUSKY, O.—Pennsylvania Railroad, Paul E. Feucht, vice president, Western Division, Chicago, will improve its Sandusky and Columbus, O., freight yards at a cost of $1,300,000.

TOLEDO, O.—Sun Oil Co., 1608 Walnut St., Philadelphia, plans to build a $600,000 oil separation plant at refinery to prevent seepage of oil into Otter Creek and Maumee Bay.

WATERVILLE, O.—Glass Fibers Inc., River Rd., plans to build a $400,000 factory-air filter plant.

YOUNGSTOWN—Trimedge Inc., producer of metal trims for floor and linoleum, recently suffered a fire with damages estimated at $1 million. Plant will be rebuilt.

TEXAS

BIG SPRING, TEX.—Cosden Petroleum Corp. plans to build a $1,500,000 catalytic cracking plant.

CORSICANA, TEX.—United States Air-Conditioning Corp., Santa Fe Bldg., Dallas, will build a $100,000 plant.

HANSFORD, TEX. — Phillips Petroleum Co., Bartlesville, Okla., will build a $1 million gasoline extraction plant.

HOUSTON, TEX.—Texas Pipe Line Co., Texas Co. Bldg., has awarded a $2,800,000 contract to Latex Construction Co., M & M Bldg., for installation of a crude oil pipeline carrier between here and Port Arthur and Port Neches.

JACINTO CITY, TEX.—Houston Asbestos Co., c/o Frank W. Sharp, 1526 Welsh St., Houston, will double the size of its plant at a cost of $250,000.

RIO GRANDE CITY, TEX.—Chicago Corp., 3105 Leopard St., Corpus Christi, will build a $350,000 gas separating and dehydrating plant and system.

SPEARMAN, TEX.—Phillips Petroleum Co., Bartlesville, Okla., plans a construction project to include a $4 million gasoline plant, a $400,000 booster station, a $250,000 gasoline storage facility and a $500,000 steam boiler plant.

TEXAS CITY, TEX.—Tin Processing Corp. has awarded a $2,700,000 contract to Chemical Construction Corp., 30 Rockefeller Plaza, New York, for a plant to reclaim hydrochloric acid and silver.

WEST VIRGINIA

WHEELING, W. VA.—Wheeling Electric Co., 51 16th St., plans to build a $500,000 substation at 42nd and Wetzell Sts.

WISCONSIN

APPLETON, WIS.—Appleton Machine Co., S. Oneida St., has awarded a contract to Miron & St. Aubin Construction Co., 139 N. Story St., for erection of a roll mill.

MILWAUKEE—Western Machine Co., 121 N. Broadway, will build a $200,000 factory and office building.

WHERE-TO-BUY *Products Directory*

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Section Two

MARCH 29, 1948

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Salem Engineering Co., Air Conditioning and Refrigeration Div., 714 S. Broadway, Salem, O.
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Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
National Motor Bearing Co., Inc., Box 1030, Redwood City, Cal.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Paul & Beekman, Inc., 1801 Courtland St., Philadelphia 40, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Scott Aviation Corp., Lancaster, N. Y.
Standard Pressed Steel Co., Box 579 Jenkintown, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
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ALLOY METALS (Nonferrous)—See METALS (Nonferrous)

ALLOY STEELS (Heat Resistant)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
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International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
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Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Alloy Steel Div., Massillon, O.
Ryerson, Jos. T. & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
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ALLOYS (Ferroalloys)—See FERROALLOYS

ALLOYS (Heat Resistant)

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Bunting Brass & Bronze Co., The, Toledo 9, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.
Permanente Metals Corp., 1924 Broadway, Oakland 12, Calif.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Riverside Metal Co., The, Riverside, N. J.

ALLOYS (Silver)

Handy & Harman, 82 Fulton St., New York 7, N. Y.

ALUMINUM (Screw Stock)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

ALUMINUM AND ALUMINUM ALLOYS

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

ANGLES—See BEAMS, CHANNELS, ANGLES

ANNEALING (Tempering)

Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23, N. Y.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.

ANNEALING BOXES

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
National Erie Corp., Erie, Pa.
Union Steel Castings Div. of Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

ANNEALING COVERS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Furnace Engineers, Inc., 1551 W. Liberty Ave., Pittsburgh 26, Pa.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Wean Engineering Co., Inc., The, Warren, O.

ANODES (All Types)

American Brass Co., The, Waterbury 88, Conn.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

ANODES (Lead & Lead Alloy)

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
National Lead Co., 111 Broadway, New York 6, N. Y.

ANODES (Nickel)

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Hanson-Van Winkle-Munning Co. Matawan, N. J.
Seymour Manufacturing Co., The, 51 Franklin St., Seymour, Conn.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

ANODES (Silver)

Handy & Harman, 82 Fulton St., New York 17, N. Y.

ANODES (Zinc)

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.

ANTIMONY

St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y.

AUTOMOTIVE ACCESSORIES, PARTS, SUPPLIES

Budd Co., The, 25th St. & Hunting Park Ave., Philadelphia 32, Pa.
Chandler Products Corp., Euclid 17, O.
Cleco Div. of the Reed Roller Bit Co., P. O. Box 2119, Houston 1, Tex.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
Ideal Industries, Inc., Sycamore, Ill.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Lukenweld Div. of Lukens Steel Co. Coatesville, Pa.
National Motor Bearing Co., Inc., Box 1030, Redwood City, Cal.

AUTOMOTIVE ACCESSORIES, PARTS, SUPPLIES (Cont'd.)

Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Steel Parts Mfg. Corp. Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.
Stewart-Wraner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
U. S. Automatic Corp., Amherst, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
Wittek Mfg. Co., 4305 W. 24th Place, Chicago 23, Ill.

AXLES

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Clark Equipment Co., Buchanan, Mich.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

BABBITT METAL

Cadman, A. W., Mfg. Co., 28th & Smallman St., Pittsburgh 22, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Lead Co., 111 Broadway, New York 6, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

BALANCING MACHINES

Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Ideal Industries, Inc., Sycamore, Ill.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

BALING PRESSES

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Dempster Brothers Inc., Knoxville 17, Tenn.
Galland-Henning Manufacturing Co., 2747 S. 31st St., Milwaukee 7, Wis.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.

BALL JOINTS (Automotive and Aircraft)

Tourek, J. J., Mfg. Co., 4701-11 West 16th St., Chicago 50, Ill.

BALLS (Brass or Bronze)

Atlas Ball Div., SKF Industries, Inc., Philadelphia 34, Pa.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Strom Steel Ball Co., 1850 S. 54th Ave., Cicero 50, Ill.

BALLS (Grinding)

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

BALLS (Special Alloy Metals)

Atlas Ball Div., SKF Industries, Inc., Philadelphia 34, Pa.

BALLS (Steel) (*Also Stainless)

*Atlas Ball Div., SKF Industries, Inc., Philadelphia 34, Pa.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
*Strom Steel Ball Co., 1850 S. 54th Ave., Cicero 50, Ill.

BAND SAW GUIDES

McGill Mfg. Co., Inc., Valparaiso, Ind.

BANDS AND HOOPS (Iron and Steel)

Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
American Welding & Mfg. Co., The, Warren, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Stanley Works, The, New Britain & Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

BARGE MOVERS

Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

BARGES (Steel)

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Avondale Marine Ways, Inc., Westwego, La.
Bethlehem Steel Co., Bethlehem, Pa.
Clinton Bridge Works, 101 S. Second St., Clinton, Iowa.
Federal Shipbuilding & Dry Dock Co., Kearny, N. J.
Gage Structural Steel Co., 3123-41 S. Hayne Ave., Chicago 8, Ill.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Midland Structural Steel Co., 1300-20 S. 54th Ave., Cicero 50, Ill.

BARGES (Wood)

Koppers Co., Wood Preserving Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

BARRELS (Aluminum)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BARRELS (Plating)

Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

BARRELS (Rubber Lined)

Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

BARRELS (Steel)

Republic Steel Corp., Niles Steel Products Div., Niles, O.

BARRELS (Tumbling)

Sturgis Products Co., Sturgis, Mich.

BARRELS (Tumbling—Coke Testing)

Brosius, Edgar E., Co., Inc., Sharpsburg Post Office, Pittsburgh 15, Pa.

BARS (Alloy Steel)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Columbia Steel Co. San Francisco 6, Calif.
Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Folkansbee Steel Corp., Pittsburgh 30, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Alloy Steel Div., Massillon, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts, Chicago 80, Ill.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BARS (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BARS (Brass, Bronze or Copper)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Bunting Brass & Bronze Co., The, Toledo 9, O.
Copperweld Steel Co., Warren, O.
Federal-Mogul Corp., 11031 Shoemaker St., Detroit 13, Mich.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17, N. Y.
Riverside Metal Co., The, Riverside, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

BARS (Cold Finished)—See STEEL (Cold Finished)

BARS (Concrete Reinforcing)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
Northwest Steel Rolling Mills, 4315 Ninth Ave., Seattle, Wash.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BARS (Iron)

Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

BARS (Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
*American Rolling Mill Co., The, Rustless Iron & Steel Div., 3400 E. Chase St., Baltimore 13, Md.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Avondale Marine Ways, Inc., Westwego, La.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
*Columbia Steel Co., San Francisco 6, Calif.
*Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
*Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
*Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia 25, Pa.
*Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
*Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
*Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Republic Bldg., Cleveland 1, O.
*Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Stanley Works, The, New Britain & Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
*United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Ward's Edgar T., Sons Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Weirton Steel Co., Weirton, W. Va.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BASES (Welded Steel)

American Welding & Mfg. Co., The, Warren, O.
Bethlehem Steel Co., Bethlehem, Pa.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Warren City Mfg. Co., Warren, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

BASES, MOTOR (Adjustable)

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Lovejoy Flexible Coupling Co., 5071 W. Lake St., Chicago 44, Ill.

BASKETS (Perforated Metal)

Diamond Mfg. Co., Wyoming, Pa.
Stanwood Corp.,
4825 W. Cortland St.,
Chicago 39, Ill.

BASKETS (Wire and Metal)

Bethlehem Steel Co., Bethlehem, Pa.
Siefen, J. J., Co.,
5657 Lauderdale Ave.,
Detroit 9, Mich.
Stanwood Corp.,
4825 W. Cortland St.,
Chicago 39, Ill.
Steel Parts Mfg. Corp., Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.

BATHS (Heat Treating, Cyanide, Salt, Silicon)

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Holden, A. F., Co., The,
P. O. Box 1898,
New Haven 8, Conn.

BATTERIES (Storage)

Edison Storage Battery Div. of Edison, Thomas A., Inc.,
West Orange, N. J.
Electric Storage Battery Co., The,
19th St. & Allegheny Ave.,
Philadelphia 32, Pa.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.

BATTERY CHARGING APPARATUS

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, O.
General Electric Co.,
Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
Westinghouse Electric Corp.,
Dept. 7-N, E. Pittsburgh, Pa.

BEAMS, CHANNELS, ANGLES, ETC. (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BEAMS, CHANNELS, ANGLES, ETC. (Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Avondale Marine Ways Inc., Westwego, La.
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Columbia Steel Co., San Francisco 6, Calif.
*Enterprise Galvanizing Co., 2525 E. Cumberland St. Philadelphia 25, Pa.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Inland tSeel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
*Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
*Republic Steel Corp., Republic Bldg., Cleveland 1, O.
*Ryerson, Jos T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
*United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BEARINGS (Aluminum, Brass or Bronze)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Ampco Metal, Inc., Dept. S-10, Milwaukee 4, Wis.
Bunting Brass & Bronze Co., The, Toledo 9, O.
Cadman, A. W., Mfg. Co., 28th & Smallman Sts., Pittsburgh 22, Pa.
Federal-Mogul Corp.,
11031 Shoemaker St.,
Detroit 13, Mich.
Johnson Bronze Co.,
550 S. Mill St., New Castle, Pa.
McGill Mfg. Co., Inc.,
Valparaiso, Ind.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co.,
470 W. Third St., Dover, O.

BEARINGS (Babbitt)

Bunting Brass & Bronze Co., The, Toledo 9, O.
Federal-Mogul Corp.,
11031 Shoemaker St.,
Detroit 13, Mich.
Johnson Bronze Co.,
550 S. Mill St., New Castle, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Lead Co., 111 Broadway, New York 6, N. Y.

BEARINGS (Ball)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Bearings Co. of America,
Lancaster, Pa.
Dodge Manufacturing Co.,
Mishawaka, Ind.
Fafnir Bearing Co.,
New Britain, Conn.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hoover Ball & Bearing Co.,
Ann Arbor, Mich.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Marlin-Rockwell Corp.,
402 Chandler St.,
Jamestown, N. Y.
McGill Mfg. Co., Inc.,
Valparaiso, Ind.
New Departure, Division of General Motors, Bristol, Conn.
SKF Industries, Inc.,
Philadelphia 32, Pa.

BEARINGS (Graphite)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Journal)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Dodge Manufacturing Corp.,
Mishawaka, Ind.
Fafnir Bearing Co.,
New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Lead Co., 111 Broadway, New York 6, N. Y.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
SKF Industries, Inc.,
Philadelphia 32, Pa.
Timken Roller Bearing Co., The, Canton 6, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Needle)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
McGill Mfg. Co., Inc.,
Valparaiso, Ind.
Torrington Co., The,
Torrington, Conn.

BEARINGS (Nonmetallic)

Goodrich, B. F., Co., The,
Akron 18, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Oilless)

Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Quill)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
McGill Mfg. Co., Inc.,
Valparaiso, Ind.

BEARINGS (Radial)

American Roller Bearing Co., 416-420 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Bearings Co. of America,
Lancaster, Pa.
Fafnir Bearing Co.,
New Britain, Conn.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hoover Ball & Bearing Co.
Ann Arbor, Mich.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
McGill Mfg. Co., Inc.,
Valparaiso, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
New Departure, Div. of General Motors, Bristol, Conn.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
Shafer Bearing Corp., Chicago 7, Ill.
SKF Industries, Inc.,
Philadelphia 32, Pa.
Timken Roller Bearing Co., The Canton 6, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Roll Neck)

American Roller Bearing Co., 416-420 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Fafnir Bearing Co.,
New Britain, Conn.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Morgan Construction Co.,
Worcester 5, Mass.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Rollway Bearing Co., Inc.,
541 Seymour St., Syracuse 4, N.Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
SKF Industries, Inc.,
Philadelphia 32, Pa.
Timken Roller Bearing Co., The, Canton 6, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Roller)

American Roller Bearing Co., 416-420 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Dodge Manufacturing Corp., Mishawaka, Ind.
Fafnir Bearing Co.,
New Britain, Conn.
Hoover Ball & Bearing Co.,
Ann Arbor, Mich.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
McGill Mfg. Co., Inc.,
Valparaiso, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Rollway Bearing Co., Inc.,
541 Seymour St., Syracuse 4, N.Y.
Shafer Bearing Corp., Chicago 7, Ill.
SKF Industries, Inc.
Philadelphia 32, Pa.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Standard Pressed Steel Co.,
Box 579, Jenkintown, Pa.
Timken Roller Bearing Co., The, Canton 6, O.

BEARINGS (Roller Tapered)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Dodge Manufacturing Corp.,
Mishawaka, Ind.
Hoover Ball & Bearing Co.,
Ann Arbor, Mich.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Timken Roller Bearing Co., The, Canton 6, O.

BEARINGS (Rolling Mill)

American Roller Bearing Co., 416-420 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Morgan Construction Co.,
Worcester 5, Mass.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Ryerson, Jos. T. & Son, Inc., 16th & Rockwell Sts.,
Chicago 80, Ill.
Shafer Bearing Corp., Chicago 7, Ill.
SKF Industries, Inc.,
Philadelphia 32, Pa.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Timken Roller Bearing Co., The, Canton 6, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Sealed)

Bearings Company of America, Lancaster, Pa.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hoover Ball & Bearing Co.,
Ann Arbor, Mich.
McGill Mfg. Co., Inc.,
Valparaiso, Ind.
New Departure, Div. of General Motors, Bristol, Conn.
Shafer Bearing Corp., Chicago 7, Ill

BEARINGS (Shaft Hanger)

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Dodge Manufacturing Corp., Mishawaka, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Shafer Bearing Corp., Chicago 7, Ill.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Thrust)

American Roller Bearing Co., 416-20 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Bearings Co. of America, Lancaster, Pa.
Fafnir Bearing Co.,
New Britain, Conn.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hoover Ball & Bearing Co.,
Ann Arbor, Mich.
McGill Mfg. Co., Inc.,
Valparaiso, Ind.
Rollway Bearing Co. Inc., 541 Seymour Ave., Syracuse 4, N. Y.
Shafer Bearing Corp., Chicago 7, Ill.
SKF Industries, Inc.,
Philadelphia 32, Pa.
Timken Roller Bearing Co., The, Canton 6, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BELTING (Conveyor)

Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass.
Goodrich, B. F., Co., The, Akron 18, O.
Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N.Y.
Steel Parts Mfg. Corp., Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

BELTING (Flat Transmission)

Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass.
Goodrich, B. F., Co., The, Akron 18, O.
Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N.Y.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

BELTING (V-Drive)

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Goodrich, B. F., Co., The, Akron 18, O.

BENDING AND STRAIGHTENING MACHINES

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Alliance Machine Co., The, Alliance, O.
American Broach & Machine Co., Ann Arbor, Mich.
American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bigwood, Joshua, & Son, Ltd., Wolverhampton, England.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Guide Co., Canfield, O.
Hallden Machine Co., The, Thomaston, Conn.
Hannifin Corp., Chicago 24, Ill.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Kardong Bros., Inc., 346 Buchanan St., Minneapolis 13, Minn.
Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewis Machine Co., 3450 E. 76th St., Cleveland 4, O.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Morgan Engineering Co., The, Alliance, O.
O'Neil-Irwin Mfg. Co., 304 8th Ave., S., Lake City, Minn.
Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.
Sutton Engineering Co., Bellefonte, Pa.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Wean Engineering Co., Inc., The, Warren, O.
Webb Corp., The, Webb City, Mo.
Williams, White & Co., 801 Third Ave., Moline, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

BENZOL AND TOLUOL RECOVERY PLANTS

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

BILLETS (Alloy & Carbon Steel)

Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Northwest Steel Rolling Mills, 4315 Ninth Ave., Seattle, Wash.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.

BILLETS—Aluminum (Forging)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BILLETS (Forging)

Alan Wood Steel Co., Conshohocken, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Copperweld Steel Co., Warren, O.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Stanley Works, The, New Britain & Bridgeport, Conn.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BILLETS AND BLOOMS (Alloy & Carbon Steel) (*Also Stainless)

*Alan Wood Steel Co., Conshohocken, Pa.
*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Copperweld Steel Co., Warren, O.
*Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
*Follansbee Steel Corp., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Harrisburg Steel Corp., Harrisburg, Pa.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
*Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.
*Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Roebling's, John A., Sons Co., Trenton, N. J.
Standard Steel Works, Div. of The Baldwin Locomotive Works, Philadephia 42, Pa.
Stanley Works, The, New Britain & Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Washburn Wire Co., Phillipsdale, R. I.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BILLETS—ALUMINUM (Forging)

Aluminum Co. of America, 212 Gulf Bldg., Pittsburgh 19, Pa.

BLAST FURNACE AIR CONDITIONING

Koppers Co., Engineering & Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.

BLAST FURNACE CLEANING (Gas)

McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Seaver, Jay J., Engineers, 100 W. LaSalle St., Chicago 2, Ill.

BLAST FURNACE COPPER Tuyeres, Valve Seats, etc.)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Bartlett-Hayward Div., Koppers Company, Baltimore 3, Md.
Smeeth-Harwood Co., 2401-09 W. Cermak Rd., Chicago 8, Ill.

BLAST FURNACE HOISTS

Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

BLAST FURNACE SPECIALTIES

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E., Co., Inc., Sharpsburg P.O., Pittsburgh 15, Pa.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Seaver, Jay J., Engineers, 100 W. LaSalle St., Chicago 2, Ill.

BLAST FURNACE STOCK HOUSES

McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Seaver, Jay J., Engineers, 100 W. LaSalle St., Chicago 2, Ill.

BLAST FURNACE STOVES

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Seaver, Jay J., Engineers, 100 W. LaSalle St., Chicago 2, Ill.

BLAST FURNACES

McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Pollock, William B., Co., The, 101 Andrews Ave., Youngstown 1, O.
Seaver, Jay J., Engineers, 100 W. LaSalle St., Chicago 2, Ill.

BLOCKS (Chain)

Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

BLOCKS AND SHEAVES

American Hoist & Derrick Co., St. Paul 1, Minn.

BLOW PIPE SYSTEMS

Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

BLOW PIPES

American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

BLOW PIPES (Oxy-Acetylene)

Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

BLOWERS & EXHAUSTERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
DeLaval Steam Turbine Co., Trenton 2, N. J.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Ideal Industries, Inc., Sycamore, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Roots-Connersville Blower Corp., Connersville, Ind.

BLUE PRINT PAPER

Post, Frederick, Co., The, 3650 N. Avondale Ave., Chicago 18, Ill.

BODIES (Truck)

Budd Co., The, 25th St. & Hunting Park Ave., Philadelphia 32, Pa.

BODIES (Truck-Detachable)

Dempster Brothers, Inc., Knoxville 17, Tenn.

BOILER HEADS

Bethlehem Steel Co., Bethlehem, Pa.

BOILER TUBES—see tubes (Boiler)

BOLT AND NUT MACHINERY

Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Landis Machine Co., Waynesboro, Pa.
National Machinery Co., The, Tiffin, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.

BOLTS (*Also Stainless)

*Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
*Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Barium Steel & Forge, Inc., Canton 1, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Co., Pittsburgh-Chicago.
*Chandler Products Corp., Euclid 17, O.
*Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, Ohio.
*National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
*Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
*Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
*Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

BOLTS (Carriage and Machine)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, Ohio.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

BOLTS (Connecting Rod)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Chandler Products Corp., Euclid 17, O.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, Ohio.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
U. S. Automatic Corp., Amherst, O.

BOLTS (Hanger)

Continental Screw Co., New Bedford, Mass.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.

Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

BOLTS (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.

BOLTS (Shackle)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Chandler Products Corp., Euclid 17, O.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Russell, Burdsall, & Ward Bolt & Nut Co., Port Chester, N. Y.
U. S. Automatic Corp., Amherst, O.

BOLTS (Special)

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Chandler Products Corp., Euclid 17, O.
Ferry Cap & Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, Ohio.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
U. S. Automatic Corp., Amherst, O.

BOLTS (Spring)

Bethlehem Steel Co., Bethlehem, Pa.
Ferry Cap & Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, Ohio.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
U. S. Automatic Corp., Amherst, O.

BOLTS (Stove)

American Screw Co., Providence 1, R. I.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Continental Screw Co., New Bedford, Mass.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, Ohio.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

BOLTS (Stove, Recessed Head)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
American Screw Co., Providence 1, R. I.
Bristol Co., The, Waterbury 91, Conn.
Chandler Products Corp., Euclid 17, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, Ohio.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Russell, Burdsall, & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.

BOLTS (Track)

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Foster, L. B., Co., Inc., P.O. Box 1647, Pittsburgh 30, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, Ohio.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

BOOTS (Safety)

Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.

BORING BARS

Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

BORING MACHINES

Baker Bros. Inc., Toledo 10, O.
Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Foote-Burt Co., The, Cleveland 8, O.
National Automatic Tool Co. Inc., S. 7th & N Sts., Richmond, Ind.

BORING MILLS

Ex-Cel-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Giddings & Lewis Machine Tool Co., Fond Du Lac, Wis.
Moline Tool Co., 102 20th St., Moline, Ill.

BORING MILLS (Vertical)

Bullard Co., The, Bridgeport 2, Conn.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Moline Tool Co., 102 20th St., Moline, Ill.

BORING TOOLS (Carbide Tipped)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., Latrobe, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

BOXES (Corrugated and Solid Fibre)

Gaylord Container Corp., 111 N. Fourth St., St. Louis 2, Mo.

BOXES (Open Hearth Charging)

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Union Steel Castings Div., Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

BOXES—STEEL (Shop, Rack and Tote)

Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

BRAKE DRUMS

Bethlehem Steel Co., Bethlehem, Pa.

BRAKE LININGS

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

BRAKES (Electric)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.

BRAKES (Hand)

O'Neil-Irwin Mfg. Co., 304 8th Ave. So., Lake City, Minn.

BRAZING

Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.

BRAZING EQUIPMENT

American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Ideal Industries, Inc., Sycamore, Ill.

BRICK (Abrasive)

Norton Co., Worcester 6, Mass.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.

BRICK (Acid Resisting)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BRICK (Chrome)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Fire Clay)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Robinson Clay Products Co., The, 1100 Second National Bank Bldg., Akron 8, O.

BRICK (Forsterite)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (High Alumina)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Norton Co., Worcester 6, Mass.

BRICK (Insulating)—See INSULATING BRICK

BRICK (Ladle)

Globe Brick Co., The, East Liverpool, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.

BRICK (Magnesia)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Norton Co., Worcester 6, Mass.

BRICK (Refractory)—See REFRACTORIES, CEMENT, ETC.

BRICK (Silica)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Silicon Carbide)

Bay State Abrasive Products Co., Union St., Westboro, Mass.
Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Norton Co., Worcester 6, Mass.

BRICK (Sleeves, Nozzles, Runners, Tuyeres)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRIDGE CRANES (Ore and Coal Handling)—See CRANES—BRIDGE (Ore and Coal Handling)

BRIDGES, BUILDINGS, VIADUCTS, STACKS, ETC.

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Bedford Foundry & Mach. Co., Bedford, Ind.
Belmont Iron Works, 22nd St. and Washington Ave., Philadelphia 46, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Clinton Bridge Works, 101 S. Second St., Clinton, Iowa.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Gage Structural Steel Co., 3123-41 S. Hayne Ave., Chicago 8, Ill.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Levinson Steel Sales Co., 33 Pride St., Pittsburgh 19, Pa.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Midland Structural Steel Co., 1300-20 S. 54th Ave., Cicero 50, Ill.
Stran Steel Div., Great Lakes Steel Corp., 607 Shelby Ave., Detroit, Mich.

BRIGHT HARDENING & ANNEALING

Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.

BROACHES

American Broach & Machine Co., Ann Arbor, Mich.
Bethlehem Steel Co., Bethlehem, Pa.
Colonial Broach Co., P.O. Box No. 37, Harper Sta., Detroit 13, Mich.
Detroit Broach Co., Inc., 20201 Sherwood Ave., Detroit 12, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.

BROACHING MACHINES

American Broach & Machine Co., Ann Arbor, Mich.
Cincinnati Milling Machine Co., Cincinnati 9, O.
Colonial Broach Co., P.O. Box No. 37, Harper Sta., Detroit 13, Mich.
Foote-Burt Co., The, Cleveland 8, O.

BROACHING PRESSES (Hydraulic)

American Broach & Machine Co., Ann Arbor, Mich.

BRUSHES (Carbon)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BRUSHES (Industrial)

Fuller Brush Co., The, Industrial Div., 3582 Main St., Hartford 2, Conn.
Pittsburgh Plate Glass Co., Brush Div., 3221 Frederick Ave., Baltimore 29, Md.
Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.

BUCKETS (Clam Shell, Dragline, Excavating, Grab, Orange Peel, Single Line)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Blaw-Knox Division of Blaw-Knox Co., Blawnox, Pa.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.

BUCKETS (Clam Shell, Dragline, Excavating, Grab, Orange Peel, Single Line) (Cont'd.)

Osgood Co., The, Marion, O.
Owen Bucket Co., 6013 Breakwater Ave., Cleveland 2, O.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

BUCKETS (Electric)

Owen Bucket Co., 6013 Breakwater Ave., Cleveland 2, O.

BUCKETS (Elevator)

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Diamond Mfg. Co., Wyoming, Pa.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.

BUCKETS (Rubber)

Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

BUCKETS (Single Hook, Automatic Dump, Automatic Single Line)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brosius, Edgar E., Co. Inc., Sharpsburg P.O., Pittsburgh 15, Pa.
Owen Bucket Co., 6013 Breakwater Ave., Cleviand 2, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

BUFFERS

Brown-Brockmeyer Co., The, P.O. Box 976, Dayton 1, O.
Vonnegut Moulder Corp., 1819 Madison Ave., Indianapolis 2, Ind.

BUILDINGS (Steel)—See BRIDGES BUILDINGS, ETC.

BULLDOZERS

Beatty Machine & Mfg. Co., 150th & Oaks Sts., Hammond, Ind.
Hannifin Corp., Chicago 24, Ill.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Unit Crane & Shovel Co., 6411 W. Burnham St., Milwaukee 14, Wis.
Williams, White & Co., 801 Third Ave., Moline, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

BURNERS (Acetylene)—See TORCHES AND BURNERS

BURNERS (Automatic)

American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

BURNERS (Pulverized Coal, Oil, Gas, Combination, Sawdust)

American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.

BURNERS (Pulverized Coal, Oil, Gas, Combination, Sawdust) (Cont'd.)

Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Johnson Gas Appliance Co., 573 "E" Ave., N. W., Cedar Rapids, Iowa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

BURNISHING, GRINDING, LAPPING OR POLISHING COMPOUNDS

Carborundum Co., The, Niagara Falls, N. Y.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Sturgis Products Co., Sturgis, Mich.
Sun Oil Co., Dept. 1, 1608 Walnut St., Philadelphia 3, Pa.

BUSHINGS (Bronze)

Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Cadman, A. W., Mfg. Co., 28th & Smallman St., Pittsburgh 22, Pa.
Federal-Mogul Corp., 11031 Shoemaker St., Detroit 13, Mich.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

BUSHINGS (Jig)

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BUSHINGS (Oilless)

United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BUTTS

Veeder-Root, Inc., Hartford 2, Conn.

BY-PRODUCT PLANTS

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

CABINETS (Refrigeration)

Westinghouse Electric Corp., Mansfield, O.

CABINETS (Steel)

Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Republic Steel Corp., Berger Mfg. Div., Canton 5, O.

CABLE (Electric)—See WIRE & CABLE (Electric)

CADMIUM

New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.
St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

CADMIUM PLATING PROCESSES AND EQUIPMENT

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

CALCIUM METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

CAMERAS

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

CAMS

Kux Machine Co., 3930 W. Harrison St., Chicago 24, Ill.

CAP SCREWS—See SCREWS (Cap, Set, Safely-Set)

CAPSTANS (Electric, Gasoline, Diesel)

American Hoist & Derrick Co., St. Paul 1, Minn.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CAR DUMPERS

Alliance Machine Co., The, Alliance, O.
Industrial Brownhoist Corp., Bay City, Mich.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CAR PULLERS and SPOTTERS

American Hoist & Derrick Co., St. Paul 1, Minn.
Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Cullen-Friestedt Co., 1308 S. Kilbourne Ave., Chicago 23, Ill.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

CARBIDE

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
National Carbide Corp., 60 E. 42nd St., New York 17, N. Y.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Shawinigan Products Corp., Empire State Bldg., New York 1, N. Y.

CARBIDE METALS (Special Parts)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Carboloy Co. Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., Latrobe, Pa.

CARBIDE TOOLS (Steel Cutting)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., Latrobe, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

CARBON SPECIALTIES

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

CARBURIZING (Pack or Gas)

Follansbee Steel Corp., Pittsburgh 30, Pa.
U. S. Automatic Corp., Amherst, O.

CARS (Charging)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CARS (Dump)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.
Differential Steel Car Co., Findlay, O.
Pressed Steel Car Co., Inc., (Industrial Div.) Grant Bldg., Pittsburgh 19, Pa.

CARS (Hot Metal Transfer)

Bartlett Hayward Div., Koppers Co., Baltimore 3, Md.
Pollock, William B., Co., The, 101 Andrews Ave., Youngstown 1, O.

CARS (Industrial and Mining)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Differential Steel Car Co., Findlay, O.
Pollock, William B., Co., The, 101 Andrews Ave., Youngstown 1, O.
Pressed Steel Car Co., Inc., (Industrial Div.) Grant Bldg., Pittsburgh 19, Pa.

CARS (Scale)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.

CARS (Tank)

General American Transportation Corp., (Tank Car Div.), 135 S. La Salle St., Chicago 90, Ill.

CASTERS

Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.

CASTING MACHINES (Centrifugal)

Allis Chalmers Mfg. Co., Milwaukee 1, Wis.

CASTING WASHER EQUIPMENT

Pangborn Corporation, Hagerstown, Md.

CASTINGS (Acid Resisting)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Cadman, A. W., Mfg. Co., 28th & Smallman St., Pittsburgh 22, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Meehanite Metal Corp., Pershing Square Bldg., New Rochelle, N. Y.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Ohio Steel Foundry Co., Lima & Springfield, O.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

CASTINGS (Alloy Iron)

Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.

CASTINGS (Alloy Steel)

Advance Foundry Co., The, 119 Seminary Ave., Dayton 3, O.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Barium Steel & Forge Inc., Canton 1, O.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Michiana Products Corp., Michigan City, Ind.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
National Erie Corp., Erie, Pa.
Ohio Steel Foundry Co., Lima, and Springfield, O.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

Union Steel Castings Div. of Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
United Engineering & Foundry Co., 1st National Bank Bldg., Pittsburgh 22, Pa.
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown 1, O.

CASTINGS (Aluminum, Brass, Bronze, Copper)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Bunting Brass & Bronze Co., The, Toledo 9, O.
Cadman, A. W., Mfg. Co., 28th & Smallman St., Pittsburgh 22, Pa.
Century Foundry Co., 3727 Market St., St. Louis 10, Mo.
Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Scott Aviation Corp., Lancaster, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.
Smeeth-Harwood Co., 2401-09 W. Cermak Rd., Chicago 8, Ill.
Titan Metal Mfg. Co., Bellefonte, Pa.
Utica Radiator Corp., Utica 2, N. Y.

CASTINGS (Centrifugal)

Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Michiana Products Corp., Michigan City, Ind.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Ohio Steel Foundry Co., Lima & Springfield, O.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown 1, O.

CASTINGS (Corrosion Resisting)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Meehanite Metal Corp., Pershing Square Bldg., New Rochelle, N. Y.
Michiana Products Corp., Michigan City, Ind.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
National Lead Co., 111 Broadway, New York 6, N. Y.
Ohio Steel Foundry Co., Lima & Springfield, O.
Reynolds Metal Co., 2520 S. Third St., Louisville 1, Ky.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

CASTINGS (Electric Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Clark Equipment Co., Buchanan, Mich.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Crucible Steel Casting Co., Lansdowne, Del. Co., Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
National Erie Corp., Erie, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Reading Steel Casting Div. of American Chain & Cable Co., Inc., Reading, Pa.
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown 1, O.

CASTINGS (Gray Iron, Alloy or Semi-Steel)

Advance Foundry Co., The, 119 Seminary Ave., Dayton 3, O.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bedford Foundry & Mach. Co., Bedford, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Century Foundry Co., 3727 Market St., St. Louis 10, Mo.
Columbia Steel Co., San Francisco 6, Calif.
Davenport Besler Corp., Davenport, Iowa.
Ferracute Machine Co., Bridgeton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Harris Foundry & Machine Co., Cordele, Ga.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Meehanite Metal Corp., Pershing Square Bldg., New Rochelle, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Oil Well Supply Co., Dallas 1, Tex.
Ottumwa Iron Works, Ottumwa, Ia.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.
Sibley Machine & Foundry Corp., 206 E. Tutt St., South Bend 3, Ind.
Wheland Co., The, Chattanooga 2, Tenn.
Wood, R. D., Co., Public Ledger Bldg., Independence Square Philadelphia 5, Pa.

CASTINGS (Heat Resisting)

Advance Foundry Co., The, 119 Seminary Ave., Dayton 3, O.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Meehanite Metal Corp., Pershing Square Bldg., New Rochelle, N. Y.
Michiana Products Corp., Michigan City, Ind.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

CASTINGS (Magnesium)

American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Light Metals, Inc., 1100-1198 E. 24th St., Indianapolis 5, Ind.
Utica Radiator Corp., 2201 Dwyer Ave., Utica 2, N. Y.

CASTINGS (Malleable)

American Chain Div., American Chain & Cable Co., Inc., York, Pa.
Lake City Malleable Co., The, 5026 Lakeside Ave., Cleveland 14, O.

CASTINGS (Permanent-Mold)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Eaton Manufacturing Co., Foundry Div., 9771 French Rd., Detroit 13, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Stewart-Warner Corp., Stewart Die Casting Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

CASTINGS (Precision, Lost Wax Process)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

CASTINGS (Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Barium Steel & Forge Inc., Canton 1, O.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Cal.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Crucible Steel Casting Co., Lansdowne, Del. Co., Pa.
Falk Corporation, The, Milwaukee 8, Wis.
*Ferracute Machine Co., Bridgeton, N. J.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
*Lebanon Steel Foundry, Lebanon, Pa.
Mackintosh-Hemphill Co., 9th & Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
*Michiana Products Corp., Michigan City, Ind.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Erie Corp., Erie, Pa.
*Ohio Steel Foundry Co., Lima & Springfield, O.
Oil Well Supply Co., Dallas 1, Tex.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Union Steel Castings Div. of Blaw-Knox Co., 62nd and Butler Sts., Pittsburgh 1, Pa.
United Engineering & Fdry Co., First National Bank Bldg., Pittsburgh 22, Pa.
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown 1, O.

CASTINGS (Wear Resisting)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hagan, George J. Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Meehanite Metal Corp., Pershing Square Bldg., New Rochelle, N. Y.
Michiana Products Corp., Michigan City, Ind.
National Alloy Steel Div., Blaw-Knox Co., Blawnox, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

CASTINGS (Worm and Gear Bronze)

Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Cadman, A. W., Mfg. Co., 28th & Smallman Sts., Pittsburgh 22, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

CEMENT (Acid Proof)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

CEMENT (Elastic)

Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

CEMENT (High Temperature)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Bay State Abrasive Products Co., Union St., Westboro, Mass.
Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Norton Co., Worcester 6, Mass.
Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, O.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

CEMENT (High Temperature Hydraulic)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.

CENTRAL STATION EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric Co., Schenectady 5, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

CHAIN (Conveyor and Elevator)

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Draw Bench)

Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Malleable)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Lake City Malleable Co., The, 5026 Lakeside Ave., Cleveland 14, O.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.

CHAIN (Power Transmission)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Morse Chain Co., Ithaca, N. Y.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Roller)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Morse Chain Co., Ithaca, N. Y.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Silent)

Morse Chain Co., Ithaca, N. Y.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Sling)

American Chain Div., American Chain & Cable Co., Inc., York, Pa.
Columbus-McKinnon Chain Corp., 118 Fremont Ave., Tonawanda, N. Y.

CHAIN (Welded & Weldless)

American Chain Div., American Chain & Cable Co., Inc., York, Pa.
Baldt Anchor, Chain & Forge Div. of The Boston Metals Co., Chester, Pa.
Columbus-McKinnon Chain Corp., 118 Fremont Ave., Tonawanda, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

CHANNELS—See BEAMS, CHANNELS, ANGLES

CHARGING BOXES

Union Steel Castings Div. of Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CHARGING MACHINES (Cupola)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Morgan Engineering Co., The, Alliance, O.

CHARGING MACHINES (Open Hearth)

Brosius, Edgar E., Co. Inc., Sharpsburg P. O., Pittsburgh 15, Pa.
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CHECKER BRICK

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.

CHECKS (Metal)

Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

CHEMICAL PROCESSING EQUIPMENT

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.

CHEMICALS (Industrial)

Aluminum Co. of America, Chemicals Div., Oliver Bldg., Pittsburgh 22, Pa.
duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
General Chemical Co., 40 Rector St., New York 6, N. Y.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

CHEMICALS (Laboratory)

Baker & Adamson Div. General Chemical Co., 40 Rector St., New York 6, N. Y.

CHISEL BLANKS

Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Keller Tool Co., Grand Haven, Mich.
Marchant, George F., Co., 1420 S. Rockwell St., Chicago 8, Ill.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.

CHROME MORTAR

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

CHROME ORE

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

CHROMIUM METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Metal & Thermit Corp., 120 Broadway, New York 5, N.Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

CHROMIUM PLATING PROCESSES AND EQUUIPMENT

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y.

CHUCKING MACHINES (Multiple Spindle)

Bullard Co., The, Bridgeport 2, Conn.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
New Britain Machine Co., New Britain, Conn.

CHUCKS

Bullard Co., The, Bridgeport 2, Conn.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

CLAMPS, CABLE (Sheet Metal)

Budd Co., The, 25th St. & Hunting Park Ave., Philadelphia 32, Pa.
Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O.

CLAMPS (Toggle)

Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Lapeer Mfg. Co., 2906 W. Grand Blvd., Detroit 2, Mich.

CLEANERS (Oil and Grease Absorbent)

Waverly Petroleum Products Co., Drexel Bldg., Philadelphia 6, Pa.

CLEANERS (Steam)

Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.
Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., Dept. S, Pensalt Cleaner Div., Philadelphia 7, Pa.

CLEANERS AND FILTERS (Air)

American Air Filter Co., Inc., 443 Central Ave., Louisville 8, Ky.
Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, O.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

CLEANING EQUIPMENT (Metal)

American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Bullard Co., The, Bridgeport 2, Conn.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Pangborn Corporation, Hagerstown, Md.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Vacu-Blast Co., Inc., 350 Peninsular Ave., San Mateo, Calif.
Wean Engineering Co., Inc., The, Warren, O.

CLEANING SPECIALTIES

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., Dept. S, Pennsalt Cleaner Div., Philadelphia 7, Pa.

CLIPS (Wire Rope)

American Hoist & Derrick Co., St. Paul 1, Minn.

CLUTCH FACINGS

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

CLUTCHES (Free Wheeling)

Morse Chain Co., Ithaca, N. Y.

CLUTCHES (Friction)

Dodge Manufacturing Corp., Mishawaka, Ind.
Falk Corporation, The, Milwaukee 8, Wis.
Jones, W. A., Fdry. & Mach. Co., 4437 W. Roosevelt Rd., Chicago 24, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Morse Chain Co., Ithaca, N. Y.

CLUTCHES (Magnetic)

Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Dings Magnetic Separator Co., 4710 W. McGeogh Ave., Milwaukee 14, Wis.

COAL OR COKE

Alan Wood Steel Co., Conshohocken, Pa.
Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Koppers Co., Gas & Coke Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Koppers Coal Div., Eastern Gas & Fuel Assoc., 300 Koppers Bldg., Pittsburgh 19, Pa.
New England Coal & Coke Co., Boston 16, Mass.
Pickands, Mather & Co., Union Commerce Bldg., Cleveland 14, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh 22, Pa.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh 22, Pa.

COAL, COKE, ORE, ASH HANDLING AND PROCESSING MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5,O.
Bethlehem Steel Co., Bethlehem, Pa.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Industrial Brownhoist Corp., Bay City, Mich.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Koppers Co., Engineering & Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Robins Conveyors, Inc., Div. of Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Thew Shovel Co., The, Lorain, O.

COATINGS (Acid & Alkali Resistant)

Rust-Oleum Corp., 2425 W. Oakton, Evanston, Ill.

COATINGS (Plastic Packaging)

Better Finishes & Coatings Inc., 268 Doremus Ave., Newark 5, N. J.

COILERS (Strip & Wire)

Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.

COILS (Direct Expansion)

Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass.

COILS (Electrical)

Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

COILS (Water or Steam)

Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass.

COKE—See COAL or COKE

COKE OVEN MACHINERY

Alliance Machine Co., The, Alliance, O.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Koppers Co., Engineering & Construction Div., 300 Koopers Bldg., Pittsburgh 19, Pa.
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

COKE OVEN (By-Product)

Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

COLLET CHUCKS

Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

COLLETS

Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

COLUMBIUM

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

COMBUSTION BOATS

Carborundum Co., The, Niagara Falls, N. Y.
Norton Company, Worcester 6, Mass.

COMBUSTION CONTROLS

Bristol Co., The, Waterbury 91, Conn.
Morgan Construction Co., Worcester 5, Mass.
Selas Corp., of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

COMPARATORS (Internal & External)

Jack & Heintz Precision Industries, Inc., Cleveland 1, O.

COMPARATORS (Optical)

American Optical Co., Scientific Instrument Div., Buffalo 15, N. Y.
Jones & Lamson Machine Co., Springfield, Vt.

COMPENSATORS (Automatic)

Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Westinghouse Electric Corp., Dept. 7N, E. Pittsburgh, Pa.

COMPOUNDS (Case Hardening, Heat Treating)

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

COMPOUNDS (Drawing & Stamping)

Brooks Oil Co., 315 E. Carson St., Pittsburgh 19, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich.
Oakite Products Inc., 34E Thames St., New York 6, N. Y.

COMPOUND (Floor Cleaning)

Oakite Products Inc., 34E Thames St., New York 6, N. Y.

COMPOUNDS (For Deep, Die Hot Forgings)

Brooks Oil Co., 315 E. Carson St., Pittsburgh 19, Pa.

COMPOUNDS (Metal Finishing, Rust Removing, Rust Preventing)

Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich.
Oakite Products Inc., 34E Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Rust-Oleum Corp., 2425 W. Oakton, Evanston, Ill.

COMPRESSORS (Air)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Curtis Pneumatic Machinery Div. of Curtis Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
Davey Compressor Co., Kent, O.
DeLaval Steam Turbine Co., Trenton 2, N. J.
Gardner-Denver Co., Williamson & Front Sts., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Kellogg Div. of The American Brake Shoe Co., 97 Humbolt St., Rochester 9, N. Y.
Roots-Connersville Blower Corp., Connersville, Ind.

COMPRESSORS (Refrigeration & Air Conditioning)

Jack & Heintz Precision Industries, Inc., Cleveland 1, O.

CONCRETE (Heat Resistant)

Babcock & Wilcox Co., Refractories Div., 85 Liberty St., New York 6, N.Y.

CONCRETE REINFORCING BARS —See BARS (Concrete Reinforcing)

CONDENSERS (Surface, Barometric Multi-Jet)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Harrisburg Steel Corp., Harrisburg, Pa.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N. Y.
Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass.

CONDUITS (Asbestos Cement)

Johns-Manville Corp., 22 E. 40th St., New York 16, N.Y.

CONDUITS (Electric)

Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.
General Electric Co., Schenectady 5, N. Y.
International Rolling Mill Products Co., Nikoh Tube Co., Div., 5033 S. Kedzie Ave., Chicago 32, Ill.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Republic Steel Corp., Steel & Tubes Div., 226 E. 131st St., Cleveland 8, O.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

CONDUITS (Wood)

Koppers Co., Wood Preserving Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

CONNECTING RODS

Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

CONTACTS & CONTACTORS (Electric)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
Trumbull Electric Mfg. Co., The, Plainville, Conn.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CONTAINERS (Shipping)

Gaylord Container Corp., 111 N. Fourth St., St. Louis 2, Mo.

CONTRACT WORK

Agerstrand Corp., Muskegon, Mich.
Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Atlas Metal Stamping Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Bridgewater Screw Products Co., Bridgewater, Mass.
Budd Co., The, 25th S. & Hunting Park Ave., Philadelphia 32, Pa.
Erie Foundry Co., Erie, Pa.
Falk Corporation, The, Milwaukee 8, Wis.
Gerding Bros., 5 E. Third St., Cincinnati 2, O.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Paul & Beekman, Inc., 1801 Courtland St., Philadelphia 40, Pa.
Swallow Airplane Co., Inc., Wichita, Kans.
Warren City Mfg. Co., Warren, O.

CONTRACTORS—See ENGINEERS AND CONTRACTORS

CONTROL EQUIPMENT (Electric)

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bristol Co., The, Waterbury 91, Conn.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Trumbull Electric Mfg. Co., The, Plainville, Conn.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CONTROL SYSTEMS (Automatic)

American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Bristol Co., The, Waterbury 91, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CONTROL SYSTEMS (Office, Tool Production Materials)

Remington Rand Inc., Systems Div., 315 Fourth Ave., New York 10, N. Y.
Wassell Organization, The, Westport, Conn.

CONTROLS (Combustion)—See COMBUSTION CONTROLS

CONTROLS (Temperature)

American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Bristol Co., The, Waterbury 91, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill. Dept. 7-N, E. Pittsburgh, Pa.
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

CONVEYING SYSTEMS (Steam Jet)

Hagan, George J., Co., 2400 E Carson St., Pittsburgh 3, Pa.

CONVEYOR BELTS

Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N.Y.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

CONVEYOR BELTS (High & Low Temperature)

Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N.Y.
Steel Parts Mfg. Corp. Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.
Wickwire Spencer Steel, Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

CONVEYOR BELTS (Wire)

Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Wickwire Spencer Steel, Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

CONVEYOR PULLEYS

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Dodge Mfg. Corp., Mishawaka, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Robins Conveyors, Inc., Div. of Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.

CONVEYORS (Apron)

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Logan Co., Inc., 536 Cabel St., Louisville 6, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Standard Conveyor Co., 315 Second Ave., N. St. Paul 9, Minn.
Union Chain & Mfg. Co., Sandusky, O.

CONVEYORS (Belt)

Bartlett, C. O. & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Logan Co., Inc., 536 Cabel St., Louisville 6, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.
Robins Conveyors, Inc., Div. of Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Standard Conveyor Co., 315 Second Ave., N. St. Paul 9, Minn.
Steel Parts Mfg. Corp. Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.

CONVEYORS (Chain)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Logan Co., Inc., 536 Cabel St., Louisville 6, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Standard Conveyor Co., 315 Second Ave., N. St. Paul 9, Minn.
Union Chain & Mfg. Co., Sandusky, O.

CONVEYORS (Drag)

Mathews Conveyer Co., Ellwood City, Pa.
Standard Conveyor Co., 315 Second Ave., N. St. Paul 9, Minn.

CONVEYORS (Elevating)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Logan Co., Inc., 536 Cabel St., Louisville 6, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Robins Conveyors, Inc., Div. of Hewitt-Robins, Inc., 270 Passaic Ave., Passaic, N. J.
Standard Conveyor Co., 315 Second Ave., N. St. Paul 9, Minn.

CONVEYORS (Overhead)

Mathews Conveyer Co., Ellwood City, Pa.

CONVEYORS (Overhead Trolley)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Mathews Conveyer Co., Ellwood City, Pa.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.

CONVEYORS (Pneumatic)

Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

CONVEYORS (Portable)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Logan Co. Inc., 536 Cabel St., Louisville 6, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.
Standard Conveyor Co., 315 Second Ave., N. St. Paul 9, Minn.

CONVEYORS (Roller—Power and Gravity)

Guide Co., Canfield, O.
Logan Co., Inc., 536 Cabel St., Louisville 6, Ky.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Standard Conveyor Co., 315 Second Ave., N. St. Paul 9, Minn.

CONVEYORS (Slat)

Logan Co. Inc., 536 Cabel St., Louisville 6, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Union Chain & Mfg. Co., Sandusky, O.

CONVEYORS (Vibrating)

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

CONVEYORS (Wheel—Gravity)

Logan Co. Inc., 536 Cabel St., Louisville 6, Ky.
Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.
Standard Conveyor Co., 315 Second Ave., N. St. Paul 9, Minn.

COOLANT SEPARATORS (Magnetic)

Barnes Drill Co., 814 Chestnut St., Rockford, Ill.

COOLERS (Liquid, Compressed Air, Gas)

Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N. Y.

COPPER—See METALS (Nonferrous)

COPPER (Phosphorized)

American Brass Co., The, Waterbury 88, Conn.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N.Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

COTTER PINS

American Chain Div., American Chain & Cable Co., Inc., York, Pa.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.

COTTER PINS (Cont'd.)

Hindley Mfg. Co., Valley Falls, R.I.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, Ohio.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.

COUNTERBORES

Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

COUNTING DEVICES

Veeder-Root, Inc., Hartford 2, Conn.

COUPLINGS (Chain)

Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Morse Chain Co., Ithaca, N. Y.
Union Chain & Mfg. Co., Sandusky, O.

COUPLINGS (Flexible)

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Crocker-Wheeler Div. of Joshua Hendy Iron Works, Ampere 33, N. J.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Falk Corporation, The, Milwaukee 8, Wis.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
General Electric Co., Schenectady 5, N. Y.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
James, D. O., Gear Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Lovejoy Flexible Coupling Co., 5071 W. Lake St., Chicago 44, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Morse Chain Co., Ithaca, N. Y.
Philadelphia Gear Works, Inc., Erie Ave. & G St., Philadelphia 34, Pa.
Poole Fdy. & Mach. Co., Woodberry, Baltimore 11, Md.
Union Chain & Mfg. Co., Sandusky, O.
Waldron, John, Corp., New Brunswick, N. J.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

COUPLINGS (Hose)

Cleco Div. of the Reed Roller Bit Co., P.O. Box 2119, Houston 1, Tex.
Goodrich, B. F., Co., The, Akron 18, O.
Hansen Manufacturing Co., The, 4031 W. 150th St., Cleveland 11, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

COUPLINGS (Pipe)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

CRADLES (Coil)

Guide Co., Canfield, O.
Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

CRANES (Charging)

Alliance Machine Co., The, Alliance, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Morgan Engineering Co., The, Alliance, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CRANES (Electric)

Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

CRANES (Gantry)

Alliance Machine Co., The, Alliance, O.
American Hoist & Derrick Co., St. Paul 1, Minn.
American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Browning, Victor R., Co., Inc., Willoughby, O.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, 2615 Atwater Ave., Detroit 7, Mich.
Northwest Engineering Co., 135 S. LaSalle St., Chicago 4, Ill.
Ohio Locomotive Crane Co., Bucyrus, O.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Thew Shovel Co., The, Lorain, O.
Unit Crane & Shovel Co., 6411 W. Burnham St., Milwaukee 14, Wis.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CRANES (Hand)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Curtis Pneumatic Machinery Div. of Curtis Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Industrial Brownhoist Corp., Bay City, Mich.
Northern Engineering Works, 2615 Atwater Ave., Detroit 7, Mich.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

CRANES (Jib)

Alliance Machine Co., The, Alliance, O.
American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Thew Shovel Co., The, Lorain, O.
Unit Crane & Shovel Co., 6411 W. Burnham St., Milwaukee 14, Wis.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

CRANES (Locomotive)

American Hoist & Derrick Co., St. Paul 1, Minn.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Northwest Engineering Co., 135 S LaSalle St., Chicago 4, Ill.
Ohio Locomotive Crane Co., Bucyrus, O.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Osgood Co., The, Marion, O.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

CRANES (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Northern Engineering Works, 2615 Atwater Ave., Detroit 7, Mich.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

CRANES (Self-propelled)

Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hughes-Keenan Co., The, 585 Newman St., Mansfield, O.
Industrial Brownhoist Corp., Bay City, Mich.
Northwest Engineering Co., 135 S. LaSalle St., Chicago 4, Ill.
Ohio Locomotive Crane Co., Bucyrus, O.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Osgood Co., The, Marion, O.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Thew Shovel Co., The, Lorain, O.
Unit Crane & Shovel Co., 6411 W. Burnham St., Milwaukee 14, Wis.

CRANES (Traveling)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Northern Engineering Works, 2615 Atwater Ave., Detroit 7, Mich.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.

CRANES, BRIDGE (Ore and Coal Handling)

Alliance Machine Co., The, Alliance, O.
Browning, Victor R., Co., Inc., Willoughby, O.
Industrial Brownhoist Corp., Bay City, Mich.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CRANKSHAFTS

Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Ohio Crankshaft Co., The, 3800 Harvard Ave., Cleveland 1, O.

CRAYONS

Markal Co., 631 N. Western Ave., Chicago 12, Ill.

CRAYONS (Metal Marking)

American Crayon Co., Sandusky, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

CRUSHERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Pulverizer Co., 1539 Macklind Ave., St. Louis 10, Mo.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.

CUPOLA LININGS

Robinson Clay Products Co., The, 1100 Second National Bank Bldg., Akron 8, O.

CUSHIONS (Pneumatic Hydraulic)

Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.

CUTTERS (Bar and Bar Products)

Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.

CUTTERS (Die Sinking & End Milling)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
O. K. Tool Co., Inc., The, Shelton, Conn.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.

CUTTERS (Gear Shaper)

Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.

CUTTERS (Herringbone Gear)

Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.

CUTTERS (Keyseating)

Davis Keyseater Co., 399 Exchange St., Rochester 8, N. Y.

CUTTERS (Sheet Metal)

Beverly Shear Co., 3004 W. 111th St., Chicago 43, Ill.

CUTTERS (Thread Milling)

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.

CUTTERS (Wire and Cable)

Ideal Industries, Inc., Sycamore, Ill.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.

CUTTING AND WELDING—See WELDING

CUTTING OILS—See OILS & COMPOUNDS (Cutting)

CUTTING-OFF MACHINES (Abrasive)

Campbell, Andrew C., Div., American Chain & Cable Co., Inc., Bridgeport 2, Conn.
Landis Machine Co., Waynesboro, Pa.

CUTTING-OFF MACHINES (Rotary)

Guide Co., Canfield, O.
Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.

Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

CYANIDING

Pittsburgh Commercial Heat Treating Co., 49th St., & A.V.R.R., Pittsburgh 1, Pa.
U. S. Automatic Corp., Amherst, O.

CYLINDERS (Air or Hydraulic)

Curtis Pneumatic Machinery Div. of Curtis Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Corp., Chicago 24, Ill.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
Northern Engineering Works, 2615 Atwater Ave., Detroit 7, Mich.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.

CYLINDERS (Pressures)

Bethlehem Steel Co., Bethlehem, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

DEGREASERS

Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., Dept. S, Pennsalt Cleaner Div., Philadelphia 7, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.

DEHUMIDIFIERS

Pittsburgh Lectrodryer Corp., P.O. Box 1766, Pittsburgh, Pa.

DEMAGNETIZERS

Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Ideal Industries, Inc., Sycamore, Ill.

DEODORANT (Plant Sanitation)

Oakite Products, Inc., 34E Thames St., New York 6, N. Y.

DEOXIDIZERS

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

DERRICKS (Steel Stiffleg, Barge or Guy)

American Hoist & Derrick Co., St. Paul 1, Minn.
Bedford Foundry & Machine Co., Bedford, Ind.

DESCALING PROCESSES AND EQUIPMENT

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Bullard Co., The, Bridgeport 2, Conn.
duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Furnace Engineers, Inc., 1551 W. Liberty Ave., Pittsburgh 26, Pa.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

DESIGNERS (Product)

Atlas Chain & Mfg. Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Pioneer Engineering & Mfg. Co., 19662 John R St., Detroit 3, Mich.

DIAMOND POWDERS

Wheel Trueing Tool Co., 3200 W. Davison Ave., Detroit 6, Mich.

DIAMOND TOOLS

Wheel Trueing Tool Co., 3200 W. Davison Ave., Detroit 6, Mich.

DIAMOND WHEELS

Norton Co., Worcester 6, Mass.

DIAMONDS (Wheel Trueing)

Wheel Trueing Tool Co., 3200 W. Davison Ave., Detroit 6, Mich.

DIE BLOCKS

Advance Foundry Co., The, 119 Seminary Ave., Dayton 3, O.
American Shear Knife Co., P.O. Box 355, Homestead, Pa.
Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Holliday, W. J., & Co., Hammond, Ind.
Jessop Steel Co., 584 Green St., Washington, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Whistler, S. B., & Sons, Inc., 748-756 Military Rd., Buffalo 7, N. Y.

DIE CASTINGS (Aluminum, Magnesium, Zinc, Copper, Tin, and Lead)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Doehler-Jarvis Corp., 386 Fourth Ave., New York 16, N. Y.
Gerity-Michigan Die Casting Co., 1365 E. Beecher St. Adrian, Mich.
Stewart-Warner Corp., Stewart Die Casting Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

DIE CENTERS

Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc. Latrobe, Pa.

DIE HEADS

Eastern Machine Screw Corp., Truman & Barclay Sts., New Haven 6, Conn.
Jones & Lamson Machine Co., Springfield, Vt.
Landis Machine Co., Waynesboro, Pa.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.

DIE SETS

Advance Foundry Co., The, 119 Seminary Ave., Dayton 3, O.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.

DIE-SINKING MACHINES

Cincinnati Milling Machine Co., Cincinnati 9, O.

DIES (Compression Riveter)

Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Marchant, George F., Co., 1420 S. Rockwell St., Chicago 8, Ill.

DIES (Forging)—See FORGING DIES

DIES (Notching)

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Whistler, S. B., & Sons, Inc., 748-756 Military Rd., Buffalo 7, N. Y.

DIES (Perforating)

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Marchant, George F., Co., 1420 S. Rockwell St., Chicago 8, Ill.
Whistler, S. B., & Sons, Inc., 748-756 Military Rd., Buffalo 7, N. Y.

DIES (Punching, Stamping, Blanking)

Advance Foundry Co., The, 119 Seminary Ave., Dayton 3, O.
Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Budd Co., The, 25th St. & Hunting Park Ave., Philadelphia 32, Pa.
Ferracute Machine Co., Bridgeton, N. J.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Guide Co., Canfield, O.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Marchant, George F., Co., 1420 S. Rockwell St., Chicago 8, Ill.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Whistler, S. B., & Sons, Inc., 748-756 Military Rd., Buffalo 7, N. Y.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

DIES (Roller)

American Roller Die Corp., 20500 St. Clair Ave., Cleveland 17, O.

DIES (Steel, Embossing)

Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

DIES (Trimming)

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.

DIES AND CHASERS (Threading)

Aeroil Engineering Corp., 18511 Euclid Ave., Cleveland 12, O.
Eastern Machine Screw Corp., Truman & Barclay Sts., New Haven 6, Conn.
Landis Machine Co., Waynesboro, Pa.

DIFFERENTIALS

Fairfield Manufacturing Co., 303 S. Earl Ave., Lafayette, Ind.

DIPPERS (Rubber)

Goodrich, B. F., Co., The, Akron 18, O.

DIPPING MACHINES (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

DISCS (Abrasive)

Armour & Co., Sandpaper Div., 1355 W. 31st St., Chicago 9, Ill.
Carborundum Co., The, Niagara Falls, N. Y.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Norton Co., Worcester 6, Mass.

DOLOMITE—FLUX AND REFRACTORIES

Baker, J. E., Co., The, 114 N. George St., York, Pa.
Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.

DOORS & SHUTTERS (Steel, Wood Rolling—Service, Fire)

Kinnear Mfg. Co., The, 1730-1800 Fields Ave., Columbus 16, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

DOWEL PINS (Steel)

Allen Mfg. Co., The, 135 Sheldon St., Hartford 1, Conn.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.

DRAFT GAGES (Indicating, Recording)

Bristol Co., The, Waterbury 91, Conn.

DRAFTING MATERIALS & EQUIPMENT

Post, Frederick, Co., The, 3650 N. Avondale Ave. Chicago 18, Ill.

DRAGLINES (Crawler)

Northwest Engineering Co., 135 S. LaSalle St., Chicago 4, Ill.
Thew Shovel Co., The, Lorain, O.

DRAW BENCHES

Aetna-Standard Engineering Co The, Home Savings Bank Bldg., Youngstown 1, O.
Bigwood, Joshua, & Son Ltd., Wolverhampton, England.
McKay Machine Co., The, 546 W. Rayen St., Youngstown 2, O.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRESSERS (Grinding Wheel)

Carborundum Co., The, Niagara Falls, N. Y.
Ideal Industries, Inc., Sycamore, Ill.
Norton Co., Worcester 6, Mass.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.

DRILL HEADS

Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Ex-Cell-O Corp., 1223 Oakman Blvd., Detroit 6, Mich.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

DRILL RODS—See RODS (Drill)

DRILLING MACHINERY

Baker Bros., Inc., Toledo 10, O.
Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Cincinnati Bickford Tool Co., The, 3220 Forrer Ave., Cincinnati 9, O.

DRILLING MACHINERY (Cont'd.)

DRILLS (Pneumatic)

Foote-Burt Co., The, Cleveland 8, O.
Guibert Steel Co., P. O. Box 1837, Pittsburgh 30, Pa.
Sibley Machine & Foundry Corp., 206 E. Tutt St., South Bend 3, Ind.
Synder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

DRILLING MACHINES (Automatic)

Baker Bros., Inc., Toledo 10, O.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
National Automatic Tool Co., Inc., S. 7th & N Sts., Richmond, Ind.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

DRILLING MACHINES (Bench and Floor Types)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Walker-Turner Co., Inc., 5013 Berckman St., Plainfield, N. J.

DRILLING MACHINES (Horizontal)

Baker Bros., Inc., Toledo 10, O.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Foote-Burt Co., The, Cleveland 8, O.
National Automatic Tool Co., Inc., S. 7th & N Sts., Richmond, Ind.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

DRILLING MACHINES (Multiple)

Baker Bros., Inc., Toledo 10, O.
Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
National Automatic Tool Co., Inc., S. 7th & N Sts., Richmond, Ind.

DRILLING MACHINES (Radial)

Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Cincinnati Bickford Tool Co., 3220 Forrer Ave., Cincinnati 9, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Foote-Burt Co., The, Cleveland 8, O.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

DRILLING MACHINES (Sensitive)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
National Automatic Tool Co., Inc., S. 7th & N Sts., Richmond, Ind.

DRILLING MACHINES (Vertical)

Baker Bros., Inc., Toledo 10, O.
Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago 6, Ill.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Cincinnati Bickford Tool Co., 3220 Forrer Ave., Cincinnati 9, O.
Cleereman Machine Tool Co., Green Bay, Wis.
Consolidated Machine Tool Corp., 565 Blossom Rd. Rochester 10, N. Y.
Foote-Burt Co., The, Cleveland 8, O.
Moline Tool Co., 102 20th St., Moline, Ill.
National Automatic Tool Co., Inc., S. 7th & N Sts., Richmond, Ind.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

DRILLS (Electric Portable)

Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.
Cleco Div. of the Reed Roller Bit Co., P. O. Box 2119 Houston 1, Tex.
Davey Compressor Co., Kent, O.
Gardner-Denver Co., Williamson & Front Sts., Quincy, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Keller Tool Co., Grand Haven, Mich.

DRILLS (Twist)—See TWIST DRILLS

DRIVES (Chain)

Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Union Chain & Mfg. Co., Sandusky, O.

DRIVES (Cut Herringbone Gear)

Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.

DRIVES (Flat-Belt)

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.

DRIVES (Helical & Herringbone)

Falk Corporation, The, Milwaukee 8, Wis.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote Bros. Gear & Machine Co., 5226 S. Western Blvd., Chicago 9, Ill.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
James, D. O., Gear Mfg. Co., 140 W. Monroe St., Chicago 7, Ill.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Philadelphia Gear Works, Inc., Erie Ave. & G Sts., Philadelphia 34, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

DRIVES (Multi-V-Belt)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Dodge Manufacturing Corp., Mishawaka, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.

DRUMS (Magnetic)

Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Dings Magnetic Separator Co., 4710 W. McGeogh Ave., Milwaukee 14, Wis.

DRUMS (Steel)

Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Republic Steel Corp., Niles Steel Products Div., Niles, O.
Wheeling Steel Corp., Wheeling, W. Va.

DRYERS (Compressed Air)

Pittsburgh Lectrodryer Corp., P. O. Box 1766, Pittsburgh, Pa.
Ruemelin Mfg. Co., 3882 N. Palmer St., Milwaukee 12, Wis.

DRYERS (Paint, Varnish, Enamel, Chemical)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Mahon, The R. C., Co., 8650 Mt. Elliott Ave., Detroit 11, Mich.
Wagner Litho Machinery Co., Hoboken, N. J.

DRYERS & COOLERS (Rotary)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.

DUCTS (Acid Fume, Rubber Lined)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
National Motor Bearing Co., Inc., Box 1030, Redwood City, Cal.

DUPLICATING EQUIPMENT

Ozalid Products Div., General Aniline & Film Corp., Johnson City, N. Y.

DUST ARRESTING EQUIPMENT

American Air Filter Co., Inc., 443 Central Ave., Louisville 8 Ky.
American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Brown-Brockmeyer Co., The, P. O. Box 976, Dayton 1, O.
Ideal Industries, Inc., Sycamore, Ill.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, O.
Pangborn Corporation, Hagerstown, Md.
Ruemelin Mfg. Co., 3882 N. Palmer St., Milwaukee 12, Wis.
Schmieg Industries, Inc., 298 Piquette Ave., Detroit 2, Mich.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

ECONOMIZERS

Salem Engineering Co., 714 S. Broadway, Salem, O.

ELECTRICAL EQUIPMENT

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4 ,Wis.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Crocker-Wheeler Div. of Joshua Hendy Iron Works, Ampere 33, N. J.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, O.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Ideal Industries, Inc., Sycamore, Ill.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Trumbull Electric Mfg. Co., The, Plainville, Conn.
United States Graphite Co., The Holland Ave., Saginaw, Mich.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

ELECTRODE HOLDERS (Welding)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Hobart Bros., Co., The, Box St. 18, Troy, O.
Lincoln Electric Co., The, Cleveland 1, O.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Tweco Products Co., Wichita 1, Kan.

ELECTRODES (Alloy) (*Also Stainless)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Arcos Corp., 318 Gulf Bldg., Philadelphia 2, Pa.
*General Electric Co., Schenectady 5, N. Y.
*Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lincoln Electric Co., The, Cleveland 1, O.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
*Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

ELECTRODES (Carbon and Graphite)

International Graphite & Electrode Corp., St. Marys, Pa.
National Carbon Co., Inc., Electrode Sales Div., 30 E. 42nd St., New York 17, N. Y.

ELECTRODES (Hard Surfacing Welding)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Arcos Corp., 318 Gulf Bldg., Philadelphia 2, Pa.
General Electric Co., Schenectady 5, N. Y.
Lincoln Electric Co., The, Cleveland 1, O.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

ELECTRODES (Resistance Welding)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

ELECTRONIC CONTROL

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

ELEVATING AND CONVEYING MACHINERY—See CONVEYORS

END MILLS

Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.

ENGINEERS (Consulting)

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Atlas Chain & Mfg. Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Pioneer Engineering & Mfg. Co., 19662 John R St., Detroit 3, Mich.
Seaver, Jay J., Engineers, 100 W. LaSalle St., Chicago 2, Ill.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Shreve, Walker & Associates, 1201 Michigan Bank Bldg., Detroit 26, Mich.
Warren City Mfg. Co., Warren, O.

ENGINEERS AND CONTRACTORS

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Brandt, Charles T. Inc., 1700 Ridgely St., Baltimore 30, Md.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Guide Co., Canfield, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.
Lombard Corp., Empire Bldg., Youngstown 3, O.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Morgan Engineering Co., The, Alliance, O.
Warren City Mfg. Co., Warren, O.
Wean Engineering Co., Inc., The, Warren, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

ENGINES (Diesel)

Cooper-Bessemer Corp., The, Mt. Vernon, O.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

ENGINES (Gas, Oil)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Ingersoll-Rand Co., 11 Broadway New York 4, N. Y.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Wisconsin Motors Corp., Milwaukee 14, Wis.

ENGINES (Steam)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
Oil Well Supply Co., Dallas 1, Tex.

EVAPORATORS

Blaw-Knox Div. of Blaw-Knox Co., Blownox, Pa.

EXCAVATORS

Northwest Engineering Co., 135 S. LaSalle St., Chicago 4, Ill.
Osgood Co., The, Marion, O.
Thew Shovel Co., The, Lorain, O.
Unit Crane & Shovel Co., 6411 W. Burnham St., Milwaukee 14, Wis.

EXHAUST HEADS

Burt Mfg. Company, The, 400 S. High St., Akron 11, O.

EXHAUST SYSTEMS (Pickling Tank)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.

FABRICATING (Metal)

Barium Steel & Forge Inc., Canton 1, O.
Clinton Bridge Works, 101 S. Second St., Clinton, Iowa.
Gage Structural Steel Co., 3123-41 S. Hayne Ave., Chicago 8, Ill.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Mahon, R. C. Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Midland Structural Steel Co., 1300-20 S. 54th Ave., Cicero 50, Ill.
Stanwood Corp., 4825 W. Cortland St., Chicago 39, Ill.
Warren City Mfg. Co., Warren, O.

FABRICATORS (Structural)

Bedford Foundry & Mach. Co., Bedford, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Clinton Bridge Works, 101 S. Second St., Clinton, Iowa.
Danley Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Gage Structural Steel Co., 3123-41 S. Hayne Ave., Chicago 8, Ill.
Guibert Steel Co., P.O. Box 1837, Pittsburgh 30, Pa.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Midland Structural Steel Co., 1300-20 S. 54th Ave., Cicero 50, Ill.
Warren City Mfg. Co., Warren, O.

FACE SHIELDS

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

FANS (Crane Cab)

Perkins, B. F., & Son, Inc., Holyoke, Mass.

FANS (Exhaust Ventilating)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.

FANS (Mechanical Draft)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.

FANS (Portable)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Perkins, B. F., & Son, Inc., Holyoke, Mass.

FANS (Wall)

Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Perkins, B. F., & Son, Inc., Holyoke, Mass.

FASTENERS (Locked In)

Elastic Stop Nut Corp of America, 2330 Vauxhall Rd., Union, N. J.

FEEDERS (Rotary)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.

FEEDS (Roll, Dial, Magazine)

Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.
Wittek Mfg. Co., 4305 W. 24th Place, Chicago 23, Ill.

FENCE (Chain Link)

Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.

FENCE POSTS (Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.

FENCING (Wire)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco 6, Cal.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Roebling's John A., Sons Co., Trenton 2, N. J.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.

FERROALLOY BRIQUETS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.

FERROALLOYS

Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Keokuk Electro-Metals Co., Keokuk, Ia.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Metal & Thermit Corp., 120 Broadway, New York 5, N.Y.
Miller & Co., 332 S. Michigan Ave., Chicago 4, Ill.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.
Vanadium Corp., of America, 420 Lexington Ave., New York 17, N. Y.

FERROBORON

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

FERROCHROME

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

FERROCOLUMBIUM

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

FERROMANGANESE

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

FERROMOLYBDENUM

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

FERROPHOSPHORUS

Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

FERROSILICON

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Keokuk Electro-Metals Co., Keokuk, Ia.
Miller & Co., 332 S. Michigan Ave., Chicago 4, Ill.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.
Southern Ferro Alloys Div. of Tennessee Products & Chemical Corp., 2108 Chestnut St., Chattanooga 2, Tenn.
Vanadium Corp., of America, 420 Lexington Ave., New York 17, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

FERROSILICON ALUMINUM

Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

FERROTITANIUM

Metal & Thermit Corp., 120 Broadway, New York 5, N.Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

FERROTUNGSTEN

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

FERROVANADIUM

Electro Metallurgical Corp., 30 E. 42nd St., New York 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

FILES (Band-Metal Cutting)

DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.

FILES AND RASPS

Disston, Henry, & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.
Simmonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

FILTER MEDIA

Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.

FILTERS (Air)—See CLEANERS AND FILTERS (Air)

FILTERS (Acid)

Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.

FILTERS (Air-Engine)

American Air Filter Co., Inc., 443 Central Ave., Louisville 8, Ky.

FILTERS (Oil)

Burt Mfg. Company, The, 400 S. High St., Akron 11, O.

FINISH, BLACK OXIDE (Chemicals for)

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.

FINISHING EQUIPMENT (Painting and Drying)

Binks Mfg. Co., 3124 W. Carroll Ave., Chicago 12, Ill.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.

FIRE BRICK—See BRICK

FIRE BRICK (Insulating)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

FIRE CLAY—See Refractories

FIRE DOORS & SHUTTERS—See DOORS & SHUTTERS

FIRE EXTINGUISHERS

"Automatic" Sprinkler Corp. of America, Brittain St., Youngstown 8, O.
C-O-Two Fire Equipment, 10 Empire St., Newark 1, N. J.
Cardox Corp., 4126 Bell Bldg., Chicago 1, Ill.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.

FIRE EXTINGUISHING SYSTEMS

"Automatic" Sprinkler Corp., of America, Brittain St., Youngstown 8, O.
C-O-Two Fire Equipment Co., 10 Empire St., Newark 1, N. J.
Cardox Corp., 4126 Bell Bldg., Chicago 1, Ill.

FITTINGS (Acid Proof)

Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

FLAME HARDENING

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Welding & Mfg. Co., The, Warren, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.
National Erie Corp., Erie, Pa.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

FLANGES (Forged Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

FLANGES (Welded Steel)

Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.

FLASH TRIMMERS

Morton Mfg. Co., Muskegon Heights, Mich.

FLEXIBLE SHAFT MACHINERY

Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

FLOORING (Monolithic)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

FLOORING (Steel)

Alan Wood Steel Co., Conshohocken, Pa.
Barium Steel & Forge, Inc., Canton 1, O.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tri-Lok Co., 5515 Butler St., Pittsburgh 1, Pa.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.

FLUE DUST CONDITIONERS

Brosius, Edgar E., Co., Inc., Sharpsburg P. O., Pittsburgh 15, Pa.

FLUORSPAR

Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

FLUXES (Brazing)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Dewey & Almy Chemical Co., Cambridge 40, Mass.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

FLUXES (Soldering, Welding & Tinning)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Solder & Flux Co., 2153 E. Norris St., Philadelphia, 25, Pa.
Dewey & Almy Chemical Co., Cambridge 40, Mass.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Kester Solder Co., 4222 Wrightwood Ave., Chicago 39, Ill.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

FOIL (Electrical Condenser)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

FORGING DIES

Steel Improvements & Forge Co., The, 942 E. 64th St., Cleveland 14, O.

FORGING MACHINERY

Alliance Machine Co., The, Alliance, O.
Baldwin Southwark Div., Baldwin Locomotive Works, Paschall P.O., Philadelphia 42, Pa.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Erie Foundry Co., Erie, Pa.
Guide Co., Canfield, O.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Industrial Brownhoist Corp., Bay City, Mich.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Morgan Engineering Co., The, Alliance, O.
National Machinery Co., The, Tiffin, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.

FORGINGS (Aluminum, Magnesium, Brass, Bronze, Copper)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Brass Co., The, Waterbury 88, Conn.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
McKaig-Hatch, Inc., 125 Skillen St., Buffalo 7, N. Y.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Titan Metal Mfg. Co., Bellefonte, Pa.
Transue & Williams Steel Forging Corp., Alliance, O.

FORGINGS (Drop) (*Also Stainless)

*Atlas Drop Forge Co., Lansing 2, Mich.
*Baldt Anchor, Chain & Forge Div. of The Boston Metals Co., Chester, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
Champion Machine & Forging Co., 3695 E. 78th St., Cleveland 5, O.
Davenport Besler Corp., Davenport, Iowa.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
Harrisburg Steel Corp., Harrisburg, Pa.
McKaig-Hatch, Inc., 125 Skillen St., Buffalo 7, N. Y.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
*Transue & Williams Steel Forging Corp., Alliance, O.

FORGINGS (Hollow Bored)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Atlas Drop Forge Co., Lansing 2, Mich.
Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.

FORGINGS (Iron and Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa., (Brackenridge, Pa.)
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
*Atlas Drop Forge Co., Lansing 2, Mich.
*Baldt Anchor, Chain & Forge Div. of The Boston Metals Co., Chester, Pa.
Barium Steel & Forge, Inc., Canton 1, O.
Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Champion Machine & Forging Co., 3695 E. 78th St., Cleveland 5, O.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
*Jessop Steel Co., 584 Green St., Washington, Pa.
McKaig-Hatch, Inc., 125 Skillen St., Buffalo 7, N. Y.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa...
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Oil Well Supply Co., Dallas 1, Tex.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
*Transue & Williams Steel Forging Corp., Alliance, O.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.

FORGINGS (Machined)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.

FORGINGS (Press)

Bethlehem Steel Co., Bethlehem, Pa.
McKaig-Hatch, Inc., 125 Skillen St., Buffalo 7, N. Y.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.

FORGINGS (Small)

Champion Machine & Forging Co., 3695 E. 78th St., Cleveland 5, O.
McKaig-Hatch, Inc., 125 Skillen St., Buffalo 7, N. Y.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Transue & Williams Steel Forging Corp., Alliance, O.

FORGINGS (Upset)

American Metal Products Co., 5959 Linsdale Ave., Detroit 4, Mich.
Atlas Drop Forge Co., Lansing 2, Mich.
Baldt Anchor, Chain & Forge Div. of The Boston Metals Co., Chester, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
McKaig-Hatch, Inc., 125 Skillen St., Buffalo 7, N. Y.
Standard Tube Co., The, 24400 Plymouth Rd., Detroit, Mich.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Transue & Williams Steel Forging Corp., Alliance, O.

FOUNDRY EQUIPMENT

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Pangborn Corporation, Hagerstown, Md.
Robins Conveyors, Inc., Div. of Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Warren City Mfg. Co., Warren, O.

FRAMES (Automobile, Motor Truck, Trailer & Bus)

Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.

FRAMES (Engine & Press)

Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.

FROGS AND SWITCHES

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

FURNACE EQUIPMENT (Water Cooled)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.

FURNACE INSULATION—See INSULATION

FURNACES (Brazing)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Electric Furnace Co., The, Salem, O.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
General Electric Co., Schenectady 5, N. Y.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y.23, N.Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

FURNACES (Controlled Atmosphere)

Electric Furnace Co., The, Salem, O.
Gas Machinery Co., The 16100 Waterloo Rd., Cleveland 10, O.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Electric Heating)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Electric Furnace Co., The, Salem, O.
General Electric Co., Schenectady 5, N. Y.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y.23, N.Y.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1257, Pittsburgh 30, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

FURNACES (Electric Melting)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y.23, N.Y.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1257, Pittsburgh 30, Pa.
Swindell-Dressler Corp., P.O. Box 1888, Pittsburgh 30, Pa.

FURNACES (Enameling)

Electric Furnace Co., The, Salem, O.
General Electric Co., Schenectady 5, N. Y.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Forging)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Electric Furnace Co., The, Salem, O.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y.23, N.Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P.O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Galvanizing)

Furnace Engineers, Inc., 1551 W. Liberty Ave., Pittsburgh 26, Pa.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
General Electric Co., Schenectady 5, N. Y .
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Gas Fired & Induction)

Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Gas or Oil)

Allied Oil Co., Inc., Standard Bldg., Cleveland 13, O.
American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Electric Furnace Co., The, Salem, O.
Furnace Engineers, Inc., 1551 W. Liberty Ave., Pittsburgh 26, Pa.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Johnson Gas Appliance Co., 573 "E" Ave., N. W., Cedar Rapids, Iowa.
Loftus Engineering Corp., 610 Smithfield St., Pittsburgh 22, Pa.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P.O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Heat Treating, Annealing, Carburizing, Hardening, Tempering)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Electric Furnace Co., The, Salem, O.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
General Electric Co., Schenectady 5, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Johnson Gas Appliance Co., 573 "E" Ave., N. W., Cedar Rapids, Iowa.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y.23, N.Y.
Loftus Engineering Corp., 610 Smithfield St., Pittsburgh 22, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp., of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P.O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Induction Melting)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.

FURNACES (Laboratory)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Dietert, Harry W., Co., 9330 Roselawn Ave., Detroit 4, Mich.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.
Johnson Gas Appliance Co., 573 "E" Ave., N. W., Cedar Rapids, Iowa.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y.23, N.Y.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.

FURNACES (Nonferrous Melting)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y.23, N.Y.
Loftus Engineering Corp., 610 Smithfield St., Pittsburgh 22, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Open Hearth)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Loftus Engineering Corp., 610 Smithfield St., Pittsburgh 22, Pa.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Swindell-Dressler Corp., P.O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

FURNACES (Portable)

Gas Machinery Co., The, 16100 Waterloo ..d., Cleveland 10, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Recuperative)

Electric Furnace Co., The, Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P.O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

FURNACES (Rivet Heating)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y.23, N.Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Sheet and Tin Mill)

Electric Furnace Co., The, Salem, O.
Furnace Engineers, Inc., 1551 W. Liberty Ave., Pittsburgh 26, Pa.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Loftus Engineering Corp., 610 Smithfield St., Pittsburgh 22, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P.O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Sintering)

Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.

FURNACES (Steel Mill)

Electro Furnace Co., The, Salem, O.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Loftus Engineering Corp., 610 Smithfield St., Pittsburgh 22, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp., of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P.O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Welding)

Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 8, Pa.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.

FURNITURE (Drafting & Engineering)

Post, Frederick, Co., The, 3650 N. Avondale Ave., Chicago 18, Ill.

FURNITURE (Shop)

New Britain Machine Co., New Britain, Conn.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

GAGE BLOCKS

DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.

GAGES

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Kennametal, Inc., Latrobe, Pa.
Merz Engineering Co., Indianapolis 7, Ind.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Stewart-Warner Corp., Instrument Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

GAGES (Automatic Control & Recording)

Bristol Co., The, Waterbury 91, Conn.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.

GAGES (Electronic)

Jack & Heintz Precision Industries, Inc., Cleveland 1, O.

GAGES (Hard Faced)

Merz Engineering Co., Indianapolis 7, Ind.

GAGES (Indicating and Recording)

Bristol Co., The, Waterbury 91, Conn.
General Electric Co., Schenectady 5, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Westinghouse Electric Corp., Orange Ave., Newark 1, N. J.

GAGES (Pressure & Vacuum Recording)

Bristol Co., The, Waterbury 91, Conn.
Helicoid Gage Div. American Chain & Cable Co., Inc., Bridgeport, Conn.

GAGES (Thread-Ring & Plug)

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Merz Engineering Co., Indianapolis 7, Ind.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.

GALVANIZING BLANKET CRYSTALS

Dewey & Almy Chemical Co., Cambridge 40, Mass.

GALVANIZING (Hot Dip)

Acme Galvanizing, Inc., Milwaukee 7, Wis.
Acme Steel & Malleable Iron Works, Buffalo, N. Y.
American Hot Dip Galvanizers Assoc., Inc., 1st National Bank Bldg., Pittsburgh 22, Pa.
American Tinning & Galvanizing Co., Erie, Pa.
Atlantic Stamping Co., Rochester, N. Y.
Atlantic Steel Co., Atlanta, Ga.
Atlas Galvanizing Inc., Los Angeles, Calif.
Cattie, Jos. P., & Bros., Gaul and Letterly Sts., Philadelphia 25, Pa.
Columbian Steel Tank Co., Kansas City 7, Mo.
Commercial Metals Treating Inc., Toledo 1, O.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.

GALVANIZING (Hot Dip) (Cont'd.)

Emsco Derrick & Equipment Co., Los Angeles 54, Calif.
Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia 25, Pa.
Equipment Steel Products Div. of Union Asbestos and Rubber Co., Blue Island, Ill.
Fanner Mfg. Co., The, Cleveland, O.
Finn, John, Metal Works, San Francisco 7, Cal.
Galvanizers Incorporated, Portland, Ore.
Gregory, Thomas, Galvanizing Works, Maspeth, N. Y.
Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh 1, Pa.
Hill, James, Mfg. Co., Providence, R. I.
Hubbard & Co., Oakland, Calif.
Independent Galvanizing Co., Newark, N. J.
International Derrick & Equipment Co., Torrance, Calif.
International-Stacey Corp., Columbus 8, O.
Isaacson Iron Works, Seattle 14, Wash.
Joslyn Co. of California, Los Angeles, Calif.
Joslyn Mfg. & Supply Co., Chicago 9, Ill.
Koven, L. O., & Bro., Inc., Jersey City, N. J.
Laughlin, Thomas Co., Portland, Maine.
Lehigh Structural Steel Co., Allentown, Pa.
Lewis Bolt & Nut Co., Minneapolis, Minn.
Los Angeles Galvanizing Co., Hutington Park, Calif.
Missouri Rolling Mill Corp., St. Louis 10, Mo.
National Telephone Supply Co., The, Cleveland 3, O.
Newark Galvanizing Co., The, Newark, O.
Oliver Iron & Steel Corp., Pittsburgh 3, Pa.
Penn Galvanizing Co., Philadelphia, Pa.
Rheem Mfg. Co., Richmond, Calif.
Riverside Foundry & Galvanizing Co., Kalamazoo, Mich.
San Francisco Galvanizing Works, San Francisco, Calif.
Southern Galvanizing Co., Baltimore 30, Md.
Standard Galvanizing Co., Chicago 18, Ill.
Superior Pacific Galvanizing Co., Los Angeles, Calif.
Western Galvanizing Co., Los Angeles 23, Calif.
Wilcox Crittenden & Co., Inc., Middletown, Conn.
Witt Cornice Co., The, Cincinnati 14, O.

GALVANIZING EQUIPMENT (Electro)

Hanson-Van Winkle-Munning Co., Matawan, N. J.

GALVANIZING PLANTS FOR SHEETS

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Wean Engineering Co., Inc., The, Warren, O.

GALVANIZING POWDER

American Solder & Flux Co., 2153 E. Norris St., Philadelphia 25, Pa.

GALVANIZING PRODUCTS

Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia 25, Pa.

GAS HOLDERS

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.

GAS MASKS

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

GAS PRODUCER PLANTS

Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Morgan Construction Co., Worcester 5, Mass.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Wood, R. D., Co., Public Ledger Bldg., Independence Sq., Philadelphia 5, Pa.

GAS RECOVERY COKE OVENS AND GAS PLANTS

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

GAS SCRUBBERS AND WASHERS

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Seaver, Jay J., Engineers, 100 W. LaSalle St., Chicago 2, Ill.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

GASKETS (Asbestos, Metal or Rubber)

Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N. Y.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
National Lead Co., 111 Broadway, New York 6, N. Y.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.

GATES (Iron & Steel)

Bethlehem Steel Co., Bethlehem, Pa.

GEAR BLANKS

American Welding & Mfg. Co., The, Warren, O.
Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Erie Corp., Erie, Pa.
Ottumwa Iron Works, Ottumwa, Ia.
Philadelphia Gear Works, Inc., Erie Ave. & G St., Philadelphia 34, Pa.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Union Steel Castings Div., Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
U. S. Automatic Corp., Amherst, O.
Waldron, John, Corp., New Brunswick, N. J.

GEAR MACHINERY (Generating)

Farrel-Birmingham Co., Inc., Ansonia, Conn.

GEAR MACHINERY (Lapping, Finishing, Checking)

Farrel-Birmingham Co., Inc., Ansonia, Conn.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.

GEARS (Nonmetallic)

Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
General Electric Co., Schenectady 5, N. Y.
Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
James, D. O., Gear Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Pittsburgh Gear & Machining Co., 2680-2700 Smallman St., Pittsburgh 22, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

GEARS (Steel Laminated)

Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Waldron, John, Corp., New Brunswick, N. J.

GEARS (Worm)

Cleveland Worm & Gear Co., The, 3270 E. 80th St., Cleveland 4, O.
DeLaval Steam Turbine Co., Trenton 2, N. J.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Fairfield Manufacturing Co., 303 S. Earle Ave., Lafayette, Ind.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
James, D. O., Gear Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Philadelphia Gear Works, Inc., Erie Ave. & G St., Philadelphia 34, Pa.
Pittsburgh Gear & Machine Co., 2680-2700 Smallman St., Pittsburgh 22, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.

GEARS AND GEAR CUTTING

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
By-Products Steel Co. Div. of Lukens Steel Co., Coatesville, Pa.
Cleveland Worm & Gear Co., The, 3270 E. 80th St., Cleveland 4, O.
DeLaval Steam Turbine Co., Trenton 2, N. J.
Dodge Manufacturing Corp., Mishawaka, Ind.
Eberhardt-Denver Co., 1408 W. Colfax Ave., Denver 4, Colo.
Fairfield Manufacturing Co., 303 S. Earl Ave., Lafayette, Ind.
Falk Corporation, The, Milwaukee 8, Wis.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
General Electric Co., Schenectady 5, N. Y.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
James, D. O., Gear Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Jones, W. A., Fdry. & Mach. Co., 4437 W. Roosevelt Rd., Chicago 24, Ill.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Erie Corp., Erie, Pa.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.
Ottumwa Iron Works, Ottumwa, Ia.
Philadelphia Gear Works, Inc., Erie Ave. & G St., Philadelphia 34, Pa.
Pittsburgh Gear & Machine Co., 2680-2700 Smallman St., Pittsburgh 22, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Universal Gear Works Inc., 1301 E. McNichols Rd., Detroit 3, Mich.
Warren City Mfg. Co., Warren, O.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

GENERATING SETS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Crocker-Wheeler Div. of Joshua Hendy Iron Works, Ampere 33, N. J.
DeLaval Steam Turbine Co., Trenton 2, N. J.
Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, O.
General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Ready-Power Co., The, 3824 Grand River Ave., Detroit 8, Mich.
Reliance Electric & Eng. Co., 1088 Ivanhoe Rd., Cleveland 10, O.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

GENERATORS (Acetylene—Portable and Stationary)

Linde Air Products Co., The, 30 E. 42nd St., New York 7, N. Y.

GENERATORS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Crocker-Wheeler Div. of Joshua Hendy Iron Works, Ampere 33, N. J.
Delco Products Div., General Motors Corp., 329 E. First St., Dayton 1, O.
Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, O.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Lincoln Electric Co., The, Cleveland 1, O.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Power Plants Inc., 1755 E. 33rd St., Cleveland 14, O.
Reliance Electric & Eng. Co., 1088 Ivanhoe Rd., Cleveland 10, O.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

GENERATORS (Inert Gas)

Roots-Connersville Blower Corp., Connersville, Ind.

GENERATORS (Plating)

Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, O.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

GLUE (Glue & Abrasive Mixed)

Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.

GLUE (Liquid Cold)

Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.

GOGGLES (Safety)

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

GRABS—FOR SHEETS, COILS, INGOTS

Mansaver Industries Inc., 3101 East St., New Haven 3, Conn.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

GRAPHITE

International Graphite & Electrode Corp., St. Marys, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

GRAPPLES

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
General Excavator Co., The, Marion, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Osgood Co., The, Marion, O.
Owen Bucket Co., 6013 Breakwater Ave., Cleveland 2, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

GRATING

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Tri-Lok Co., 5515 Butler St., Pittsburgh 1, Pa.

GREASE (Lubricating)—See LUBRICANTS (Industrial)

GREASE SEALS

Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.
National Motor Bearing Co., Inc., Box 1030, Redwood City, Cal.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

GRILLS (Perforated Metal)

Diamond Mfg. Co., Wyoming, Pa.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.

GRINDER ATTACHMENTS

Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Landis Machine Co., Waynesboro, Pa.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester 6, Mass.

GRINDER CENTERS

Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Kennametal, Inc., Latrobe, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

GRINDER HEADS

Vonnegut Moulder Corp., 1819 Madison Ave., Indianapolis 2, Ind.

GRINDERS (Automotive reconditioning)

Landis Tool Co., Waynesboro, Pa.

GRINDERS (Bench & Floor Type)

Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Brown-Brockmeyer Co., The, P.O. Box 976, Dayton 1, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.
Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.
Vonnegut Moulder Corp., 1819 Madison Ave., Indianapolis 2, Ind.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

GRINDERS (Broach)

Colonial Broach Co., P. O. Box 37, Harper Sta., Detroit 13, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

GRINDERS (Carbide Tool)

Brown-Brockmeyer Co., The P.O. Box 976, Dayton 1, O.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.

GRINDERS (Centerless—Internal and External)

Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Landis Tool Co., Waynesboro, Pa.

GRINDERS (Chucking)

Landis Tool Co., Waynesboro, Pa.

GRINDERS (Circular Saw)

Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, O.

GRINDERS (Crank Pin, Cam, Piston, Valve Face)

Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester 6, Mass.

GRINDERS (Cylindrical)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester 6, Mass.

GRINDERS (Die)

Baker Bros., Inc., Toledo 10, O.
Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Landis Machine Co., Waynesboro, Pa.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.
Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.

GRINDERS (Plain and Universal)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Landis Tool Co., Waynesboro, Pa.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Norton Co., Worcester 6, Mass.

GRINDERS (Portable)

Cleco Div. of the Reed Roller Bit Co., P.O. Box 2119, Houston 1, Tex.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Keller Tool Co., Grand Haven, Mich.
Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.

GRINDERS (Precision Thread)

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Jones & Lamson Machine Co., Springfield, Vt.
Landis Machine Co., Waynesboro, Pa.
Landis Tool Co., Waynesboro, Pa.

GRINDERS (Roll)

Farrel-Birmingham Co., Inc., Ansonia, Conn.
Landis Tool Co., Waynesboro, Pa.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
Norton Co., Worcester 6, Mass.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

GRINDERS (Shear Knife)

Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Mattison Machine Works, Rockford, Ill.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

GRINDERS (Sheet Steel & Internal Tube)

Mattison Machine Works, Rockford, Ill.

GRINDERS (Single Slide Internal)

Bryant Chucking Grinder Co., 257 Clinton St., Springfield, Vt.

GRINDERS (Spline)

Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

GRINDERS (Surface)

Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Foote-Burt Co., The, Cleveland 8, O.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Kling Bros. Engineering Works 1328S N. Kostner Ave., Chicago 51, Ill.
Mattison Machine Works, Rockford, Ill.
Norton Co., Worcester 6, Mass.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

GRINDERS (Tool and Cutter)

Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Brown-Brockmeyer Co., The, P.O. Box 976, Dayton 1, O.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Cincinnati Milling Machine Co., Cincinnati 9, O.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Hannifin Mfg. Corp., Chicago 24, Ill.
Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.
Landis Tool Co., Waynesboro, Pa.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Norton Co., Worcester 6, Mass.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

GRINDERS AND BUFFERS

Brown-Brockmeyer Co., The, P. O. Box 976, Dayton 1, O.
Vonnegut Moulder Corp., 1819 Madison Ave., Indianapolis 2, Ind.

GRINDING (Shear Knife)

American Shear Knife Co., P.O. Box 355, Homestead, Pa.
Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.

GRINDING (Surface)

Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.

GRINDING MACHINES (Gear)

Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.

GRINDING—PRECISION (Contract)

Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.

GRINDING WHEELS

Bay State Abrasive Products Co., Union St., Westboro, Mass.
Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Keystone Abrasive Wheel Inc., Carnegie, Pa.
Norton Co., Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Vonnegut Moulder Corp., 1819 Madison Ave., Indianapolis 2, Ind.

GRINDING WHEELS (Mounted)

Bay State Abrasive Products Co., Union St., Westboro, Mass.
Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Keystone Abrasive Wheel Inc., Carnegie, Pa.
Norton Co., Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.

GRINDING WHEELS (Segmental)

Bay State Abrasive Products Co., Union St., Westboro, Mass.
Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.

GUIDE SHOES

Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown 1, O.

GUIDES (Mill)

Ampco Metal Inc., Dept S-10, Milwaukee 4, Wis.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Erie Corp., Erie, Pa.
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown 1, O.

GUIDES (Valve)

Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.

GUNS (Blast Furnace Mud)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E., Co. Inc., Sharpsburg P.O., Pittsburgh 15, Pa.

GUNS (Steam, Hydraulic, Electric)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E., Co. Inc., Sharpsburg P.O., Pittsburgh 15, Pa.

HAMMER BOARDS

Irwin Mfg. Co., Inc., Garland, Pa.

HAMMERS (Double Acting, Air or Steam Operated)

Alliance Machine Co., The, Alliance, O.
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Bay City, Mich.
Industrial Brownhoist Corp.,
Morgan Engineering Co., The, Alliance, O.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.

HAMMERS (Pneumatic & Electric)

Cleco Div. of the Reed Roller Bit Co., P.O. Box 2119, Houston 1, Tex.
Gardner-Denver Co., Williamson & Front Sts., Quincy, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Keller Tool Co., Grand Haven, Mich.
Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.

HAMMERS (Power)

Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

HAMMERS DROP (Air Steam, Mechanical Lift)

Chambersburg Engineering Co., Chambersburg, Pa.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Williams, White & Co., 801 Third Ave., Moline, Ill.

HAMMERS DROP (Board)

Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Industrial Brownhoist Corp., Bay City, Mich.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.

HANGERS

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Power Piping Div. of Blaw-Knox Co., Beaver & Western Ave., Pittsburgh 2, Pa.
SKF Industries, Inc., Philadelphia 32, Pa.

HAULAGE SYSTEMS

Dempster Brothers, Inc., Knoxville 17, Tenn.

HEADING MACHINERY

Hill Acme Co., 6100 Breakwater Ave., Cleveland 2, O.
National Machinery Co., The, Tiffin, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.

HEADS (Tank)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Worth Steel Co., Claymont, Del.

HEAT EXCHANGERS

Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N.Y.
Standard Tube Co., The, 24400 Plymouth Rd., Detroit, Mich.
Stewart-Warner Corp., Heater Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

HEAT TREATING and HARDENING

Barium Steel & Forge, Inc., Canton 1, O.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Pittsburgh Commercial Heat Treating Co., 49th St. & A.V.R.R., Pittsburgh 1, Pa.

HEAT TREATING MATERIALS

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

HEATERS (Air)

Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Standard Tube Co., The, 24400 Plymouth Rd., Detroit, Mich.

HEATERS (Instantaneous)

Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N.Y.

HEATERS (Unit)

Airtherm Manufacturing Co., 700 S. Spring Ave., St. Louis 10, Mo.
American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Stewart-Warner Corp., Heater Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Westinghouse Electric Corp., Mansfield, O.

HELMETS (Blast Cleaning)

American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.
Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

HELMETS (Welding)

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

HINGES AND BUTTS

Veeder-Root, Inc., Hartford 2, Conn.

HITCHINGS (Mine Car)

American Chain & Cable Co., Inc., Bridgeport 2, Conn.

HOBBING MACHINES

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

HOB CHECKING MACHINES

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

HOBS

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.

HOIST (Chain)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp., 118 Fremont St., Tonawanda, N. Y.
Cleveland Tramrail Div., of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Ford Chain Block Div., American Chain & Cable Co., Inc., 2nd & Diamond St., Philadelphia 22, Pa.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

HOISTS (Diesel, Gasoline, Steam)

American Hoist & Derrick Co., St. Paul 1, Minn.

HOISTS (Electric)

American Hoist & Derrick Co., St. Paul 1, Minn.
American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Browning, Victor R., Co., Inc., Willoughby, O.
Chisholm-Moore Hoist Corp., 118 Fremont St., Tonawanda, N. Y.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Northern Engineering Works, 2615 Atwater Ave., Detroit 7, Mich.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Weliman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

HOISTS (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp., 118 Fremont St., Tonawanda, N. Y.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The, 1865 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Northern Engineering Works, 2615 Atwater Ave., Detroit 7, Mich.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

HOISTS (Pneumatic)

Curtis Pneumatic Machinery Div. of Curtis Mfg. Co., 1936 Kienlen Ave., St. Louis 20, Mo.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Keller Tool Co., Grand Haven, Mich.
Northern Engineering Works, 2615 Atwater Ave., Detroit 7, Mich.

HOISTS (Truck Body)

Dempster Brothers, Inc., Knoxville 17, Tenn.

HONING MACHINES

Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 4, Mich.
Moline Tool Co., 102 20th St., Moline, Ill.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

HOOKS (Bed Packing)

Continental Screw Co., New Bedford, Mass.

HOOKS (Chain)

American Chain Div. American Chain & Cable Co., Inc., York, Pa.
Bethlehem Steel Co., Bethlehem, Pa.

HOOPS (Welded Wire)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Keystone Steel & Wire Co., Peoria 7, Ill.

HOOPS—See BANDS AND HOOPS (Iron and Steel)

HOPPERS (Motorized)

Detroit Power Screwdriver Co., 2813 W. Fort St., Detroit 16, Mich.

HOSE (Flexible Metal)

Chicago Metal Hose Corp., 1315 S. Third St., Maywood, Ill.
National-Standard Co., Niles, Mich.
Penflex Sales Co., Div. of Pennsylvania Flexible Metallic Tubing Co., 7250 Powers Lane, Philadelphia 42, Pa.
Titeflex Inc., 1060 Broad St., Newark 5, N. J.

HOSE (Rubber)

Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass.
Cleco Div. of the Reed Roller Bit Co., P. O. Box 2119, Houston 1, Tex.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Goodrich, B. F., Co., The, Akron 18, O.
Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N. Y.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.
Welding Engineering Co., 264 E. Ogden Ave., Milwaukee 2, Wis.

HOSE CLAMPS, FITTINGS, NIPPLES AND MENDERS

Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Wittek Mfg. Co., 4305 W. 24th Place, Chicago 23, Ill.

HYDRAULIC MACHINERY

Alliance Machine Co., The, Alliance, O.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Chambersburg Engineering Co., Chambersburg, Pa.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Guide Co., Canfield, O.
Hannifin Corp., Chicago 24, Ill.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Kux Machine Co., 3930 W. Harrison St., Chicago 24, Ill.
Morgan Engineering Co., The, Alliance, O.
National Erie Corp., Erie, Pa.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Williams, White & Co., 801 Third Ave., Moline, Ill.

HYDRAULIC PRESSES—See PRESSES (Hydraulic)

HYDRAULIC UNITS

Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Weinman Pump & Supply Co., The, 207-209 Boluevard of the Allies, Pittsburgh 22, Pa.

INDEX TABLES (Machine Tool)

Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.

INDICATORS (Blast Furnace Stock Line)

Bristol Co., The, Waterbury 91, Conn.
Brosius, Edgar E., Co., Inc., Sharpsburg P. O., Pittsburgh 15, Pa.

INDICATORS (Electronic)

Jack & Heintz Precision Industries, Inc., Cleveland 1, O.

INDICATORS (Temperature)

American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Bristol Co., The, Waterbury 91, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Stewart-Warner Corp., Instrument Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Westinghouse Electric Corp., Orange Ave., Newark 1, N. J.
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

INDUCTION BRAZING and SOLDERING EQUIPMENT

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
Johnson Gas Appliance Co., 573 "E" Ave., N. W., Cedar Rapids, Iowa.

Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23, N. Y.
Ohio Crankshaft Co., The, 3800 Harvard Ave., Cleveland 1, O.

INDUCTION HARDENING

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Pittsburgh Commercial Heat Treating Co., 49th St. & A.V.R.R., Pittsburgh 1, Pa.

INDUCTION HEATING and HARDENING EQUIPMENT

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Lepel High Frequency Laboratories, Inc., 39 W. 60 St., New York 23, N. Y.
Ohio Crankshaft Co., The, 3800 Harvard Ave., Cleveland 1, O.
Van Norman Co., 3640 Main St., Springfield, Mass.
Westinghouse Electric Corp., Baltimore 3, Md.

INDUCTION MELTING EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

INFRA-RED EQUIPMENT (Baking, Drying, Dehydrating, Preheating)

Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Trumbull Electric Mfg. Co., The, Plainville, Conn.

INGOT MOLD WASH (GRAPHITE)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

INGOT MOLDS

Bethlehem Steel Co., Bethlehem, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Shenango-Penn Mold Co., Oliver Bldg., Pittsburgh 22, Pa.
Valley Mould & Iron Co., Hubbard, O.

INHIBITORS

Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

INSPECTING TOOLS

Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.

INSPECTION EQUIPMENT

American Optical Co., Scientific Instrument Div., Buffalo 15, N. Y.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.

INSTRUMENTS (Counting)

Veeder-Root, Inc., Hartford 2, Conn.

INSTRUMENTS (Electric-Indicating and Recording)

Bristol Co., The, Waterbury 91, Conn.
Brush Development Co., The, 3405 Perkins Ave., Cleveland 14, O.
General Electric Co., Schenectady 5, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

INSULATING BLOCK OR BRICK

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Carborundum Co., The, Niagara Falls, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, O.

INSULATING CONCRETE

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

INSULATING POWDER AND CEMENT

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, O.

INSULATION (Building)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

INSULATION (Electrical)

Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, O.

INSULATION (Furnace, Boiler Settings, Ovens, Steam Pipe, Etc.)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, O.

IRON ORE

Alan Wood Steel Co., Conshohocken, Pa.
Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Pickands Mather & Co., Union Commerce Bldg., Cleveland 14, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh 22, Pa.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh 22, Pa.

JACKS (For Machine Leveling)

Baker Bros., Inc., Toledo 10, O.

JETS (Steam)

Heil Process Equipment Co., 12903 Elmwood Ave., Cleveland 11, O.

JIG BORERS

Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago 6, Ill.
Cleereman Machine Tool Co., Green Bay, Wis.

JIGS AND FIXTURES

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.

JOINTS (Universal)

Lovejoy Flexible Coupling Co., 5071 W. Lake St., Chicago 44, Ill.

KEYS (Machine or Woodruff)

Moltrup Steel Products Co., Beaver Falls, Pa.
Morton Mfg. Co., Muskegon Heights, Mich.

KEYSEATERS

Baker Bros., Inc., Toledo 10, O.
Davis Keyseater Co., 399 Exchange St., Rochester 8, N. Y.
Morton Mfg. Co., Muskegon Heights, Mich.

KNIVES

American Shear Knife Co., P. O. Box 355, Homestead, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.
Disston, Henry, & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.

LABORATORY EQUIPMENT

American Optical Co., Scientific Instrument Div., Buffalo 15, N. Y.
Dietert, Harry W., Co., 9330 Roselawn Ave., Detroit 4, Mich.
Precision Scientific Co., 3737 Cortland St., Chicago 47, Ill.

LABORATORY WARE

Bay State Abrasive Products Co., Union St., Westboro, Mass.
Norton Company, Worcester 6, Mass.

LADLES

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Pollock, William B., Co., The, 101 Andrews Ave., Youngstown 1, O.

LAMP GUARDS

McGill Mfg. Co., Inc., Valparaiso, Ind.

LAPPING MACHINES

Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Norton Company, Worcester 6, Mass.

LARRIES (Coal)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Differential Steel Car Co., Findlay, O.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

LATHE ATTACHMENTS

Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Monarch Machine Tool Co., The, Sidney, O.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

LATHE CENTERS

Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Ideal Industries, Inc., Sycamore, Ill.
Kennametal, Inc., Latrobe, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.

LATHE DOGS (Drop Forged)

South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.

LATHE TOOLS (Carbide Tipped)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Kennametal, Inc., Latrobe, Pa.

LATHES (Automatic)

Brown & Sharpe Mfg. Co., Providence, R. I.
Bullard Co., The, Bridgeport 2, Conn.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Jones & Lamson Machine Co., Springfield, Vt.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Monarch Machine Tool Co., The, Sidney, O.
Potter & Johnston Machine Co., 1027 Newport Ave., Pawtucket, R. I.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.

LATHES (Automatic Chucking)

Potter & Johnston Machine Co., 1027 Newport Ave., Pawtucket, R. I.

LATHES (Automatic Turret)

Potter & Johnston Machine Co., 1027 Newport Ave., Pawtucket, R. I.

LATHES (Buffing & Polishing)

Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

LATHES (Chucking)

Bullard Co., The, Bridgeport 2, Conn.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Potter & Johnston Machine Co., 1027 Newport Ave., Pawtucket, R. I.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

LATHES (Crankshaft)

LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.

LATHES (Double End)

LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

LATHES (Engine)

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Coulter, James, Machine Co., The, 629 Railroad Ave., Bridgeport 5, Conn.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Monarch Machine Tool Co., The, Sidney, O.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.

LATHES (Gap)

LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.

LATHES (Gun)

LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.

LATHES (Hollow Spindle or Oil Country)

LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.

LATHES (Manufacturing)

Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Monarch Machine Tool Co., The, Sidney, O.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.

LATHES (Roll Turning)

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
United Engineering & Fdry Co., First National Bank Bldg., Pittsburgh 22, Pa.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

LATHES (Tool Room)

LeBlond, R. K., Machine Tool Co., Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Monarch Machine Tool Co., The, Sidney, O.

LATHES (Turret)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Bullard Company, The, Bridgeport 2, Conn.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Jones & Lamson Machine Co., Springfield, Vt.
Potter & Johnston Machine Co., 1027 Newport Ave., Pawtucket, R. I.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

LATHES (Turret, Vertical)

Bullard Co., The, Bridgeport 2, Conn.

LEAD (Pigs)

Anaconda Sales Co., 25 Broadway, New York 4, N. Y.
St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y.

LEAD (Red, White, Litharge)

National Lead Co., 111 Broadway, New York 6, N. Y.

LEAD (Sheets, Pipe, etc.)

National Lead Co., 111 Broadway, New York 6, N. Y.

LEAD (Tellurium)

National Lead Co., 111 Broadway, New York 6, N. Y.

LEVELING MACHINES

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Guide Co., Canfield, O.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
McKay Machine Co., The, 546 W. Rayen St., Youngstown 2, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Paxson Machine Co., Benton Rd., Salem, O.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

LIFT TRUCKS—See TRUCKS (Lift)

LIFTING MAGNETS—See MAGNETS (Lifting)

LIFTS (Monorail)

American Monorail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

LIGHTING (Fluorescent Equipment)

Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

LIGHTING (Industrial)

Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

LIME (Chemical and Fluxing)

Baker, The J. E., Co., 114 N. George St., York, Pa.

LIMESTONE (Open Hearth & Blast Furnace)

Baker, The J. E. Co., 114 N. George St., York, Pa.
Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.

LINERS (Mill)

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

LINERS (Pump and Cylinder)

Harrisburg Steel Corp., Harrisburg, Pa.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

LOCOMOTIVE CRANES—Se CRANES (Locomotive)

LOCOMOTIVES (Diesel-Electric)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Davenport Besler Corp., Davenport, Iowa.
Differential Steel Car Co., Findlay, O.
Fate-Root-Heath Co., Plymouth, O.
Plymouth Locomotive Works, Plymouth, O.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Diesel-Mechanical)

Fate-Root-Heath Co., Plymouth, O.
Plymouth Locomotive Works, Plymouth, O.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Electric)

Davenport Besler Corp., Davenport, Iowa.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.

LOCOMOTIVES (Electric Trolley)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Differential Steel Car Co., Findlay, O.
General Electric Co., Schenectady 5, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Fireless)

Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.

LOCOMOTIVES (Gasoline-Electric)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Davenport Besler Corp., Davenport, Iowa.
Differential Steel Car Co., Findlay, O.
Fate-Root-Heath Co., Plymouth, O.
General Electric Co., Schenectady 5, N. Y.
Plymouth Locomotive Works, Plymouth, O.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVE (Gasoline)—Mechanical)

Davenport Besler Corp., Davenport, Iowa.
Differential Steel Car Co., Findlay, O.
Fate-Root-Heath Co., Plymouth, O.
Plymouth Locomotive Works, Plymouth, O.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Oil-Electric)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Differential Steel Car Co., Findlay, O.

LOCOMOTIVES (Steam)

Davenport Besler Corp., Davenport, Iowa.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.

LOCOMOTIVES (Storage Battery)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
General Electric Co., Schenectady 5, N. Y.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOUVERS

Burt Mfg. Company, The, 400 S. High St., Akron 11, O.

LUBRICANTS (Drawing)

Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
New York & New Jersey Lubricant Co., 292 Madison Ave., New York 17, N. Y.
Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich.

LUBRICANTS (Industrial)

Brooks Oil Co., 315 E. Carson St., Pittsburgh 19, Pa.
Cities Service Oil Company, 60 Wall Tower, New York 5, N. Y.
Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
New York & New Jersey Lubricant Co., 292 Madison Ave., New York 17, N. Y.
Sinclair Refining Co., 630 Fifth Ave., New York 20, N. Y.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Stuart, D. A., Oil Co., Ltd., 2735½ S. Troy St., Chicago 23, Ill.
Sun Oil Co., Dept. 1, 1608 Walnut St., Philadelphia 3, Pa.
Texas Co., The, 135 East 42nd St., New York 17, N. Y.
Tide Water Associated Oil Co., 17 Battery Place, New York 4, N. Y.

LUBRICATING DEVICES

Blaw-Knox Lubricators Div., Blawnox, Pa.
Farval Corp., The, 3270 E. 80th St., Cleveland 4, O.
Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

LUBRICATING SYSTEMS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Farval Corp., The, 3270 E. 80th St., Cleveland 4, O.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

LUGS (Terminal)

Calumet & Hecla Consolidated Copper Co., Wolverine Tube Div., 1439 Central Ave., Detroit 9, Mich.

MACHINE WORK

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Roller Die Corp., 20500 St. Clair Ave., Cleveland 17, Ohio
Avondale Marine Ways, Inc., Westwego, La.
Barium Steel & Forge, Inc., Canton 1, O.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Federal Shipbuilding & Dry Dock Co., Kearny, N. J.
Guide Co., Canfield, O.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Morgan Engineering Co., The, Alliance, O.
Ottumwa Iron Works, Ottumwa, Ia.
Pollock, William B., Co., The, 101 Andrews Ave., Youngstown 1, O.
Swallow Airplane Co., Inc., Wichita, Kans.
Thomas Machine Mfg. Co., Etna Branch, P. O., Pittsburgh 23, Pa.
Universal Gear Works Inc., 1301 E. McNichols Rd., Detroit 3, Mich.
Warren City Mfg. Co., Warren, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

MACHINERY (Automatic Transfer Processing)

Foote-Burt Co., The, Cleveland 8, O.
Greenlee Bros. & Co., 1927 Mason Ave., Rockford, Ill.

MACHINERY (Can and Container)

Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.

MACHINERY (Die-Casting)

Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Kux Machine Co., 3930 W. Harrison St., Chicago 24, Ill.
Lester-Phoenix, Inc., 2629 Church Ave., Cleveland 13, O.

MACHINERY (Flexible Shaft)—See FLEXIBLE SHAFT MACHINERY

MACHINERY (Lithographing)

Wagner Litho Machinery Co., Hoboken, N. J.

MACHINERY (Plastic Molding)

Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Columbia Machinery & Engineering Corp., Hamilton, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Kux Machine Co., 3930 W. Harrison St., Chicago 24, Ill.
Lester-Phoenix, Inc., 2629 Church Ave., Cleveland 13, O.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

MACHINERY (Special)

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Alliance Machine Co., The, Alliance, O.
American Roller Die Corp., 20500 St. Clair Ave., Cleveland 17, O.
American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Atlas Chain & Mfg. Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Baker Bros. Inc., Toledo 10, O.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Pascall P. O., Philadelphia 42, Pa.
Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Brosius, Edgar E., Co., Inc., Sharpsburg P. O., Pittsburgh 15, Pa.
Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.
Cleveland Automatic Machine Co., The, 4932 Beech St., Cincinnati 12, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Coulter, James, Machine Co., The, 629 Railroad Ave., Bridgeport 5, Conn.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Etna Machine Co., The, 3400 Maplewood Ave., Toledo 10, O.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Ferracute Machine Co., Bridgeton, N. J.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Foote-Burt Co., The, Cleveland 8, O.
Greenlee Bros. & Co., 1927 Mason Ave., Rockford, Ill.
Gulbert Steel Co., P. O. Box 1837, Pittsburgh 30, Pa.
Guide Co., Canfield, O.
Hallden Machine Co., The, Thomaston, Conn.
Hannifin Corp., Chicago 24, Ill.
Harris Foundry & Machine Co., Cordele, Ga.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Moline Tool Co., 102 20th St., Moline, Ill.
Morgan Engineering Co., The, Alliance, O.
National Automatic Tool Co., Inc., S. 7th & N Sts., Richmond, Ind.
National Erie Corp., Erie, Pa.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Oil Well Supply Co., Dallas 1, Texas.
Paxson Machine Co., Benton Rd., Salem, O.
Pioneer Engineering & Mfg. Co., 19662 John R. St., Detroit 3, Mich.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Shuster, F. B., Mfg. Co., Inc., The, New Haven 9, Conn.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
U. S. Automatic Corp., Amherst, O.
Wagner Litho Machinery Co., Hoboken, N. J.
Warren City Mfg. Co., Warren, O.
Wean Engineering Co., Inc., The, Warren, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Williams, White & Co., 801 Third Ave., Moline, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Sq., Philadelphia 5, Pa.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

MACHINERY (Used & Rebuilt)

Iron & Steel Products, Inc., Hegewisch Sta., Chicago 3, Ill.
West Penn Machinery Co., 1208 House Bldg., Pittsburgh 22, Pa.

MACHINERY (Vending)

Gerding Bros., 5 E. Third St., Cincinnati 2, O.

MACHINERY (Welding Wire)

Shuster, F. B., Mfg. Co., Inc., The, New Haven 9, Conn.

MACHINES (Marking)

Ideal Industries, Inc., Sycamore, Ill.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

MACHINES (Photocopying)

Ozalid Products Div., General Aniline & Film Corp., Johnson City, N. Y.

MAGNESIA (Electrically Fused)

Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Norton Co., Worcester 6, Mass.

MAGNESIA-REFRACTORIES—See REFRACTORIES (Magnesia)

MAGNETIC SEPARATORS—See SEPARATORS (Magnetic)

MAGNETOS

Jack & Heintz Precision Industries, Inc., Cleveland 1, O.

MAGNETS (Lifting)

Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Dings Magnetic Separator Co., 4710 W. McGeogh Ave., Milwaukee 14, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Unit Crane & Shovel Co., 6411 W. Burnham St., Milwaukee 14, Wis.

MAGNETS (Separating)

Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Dings Magnetic Separator Co., 4710 W. McGeogh Ave., Milwaukee 14, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.

MANDRELS

Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.

MANGANESE METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

MANGANESE ORE

Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

MANIFOLDS (Cylinder)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

MANIPULATORS

Alliance Machine Co., The, Alliance, O.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Brosius, Edgar E., Co., Inc., Sharpsburg P. O., Pittsburgh 15, Pa.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

MARKING DEVICES

American Crayon Co., Sandusky, O.
Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Ideal Industries, Inc., Sycamore, Ill.
Markal Co., 631 N. Western Ave., Chicago 12, Ill.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

METAL (Perforated)—See PERFORATED METAL

METAL CLEANERS

duPont de Nemours, E. I., & Co., Inc. ,Wilmington 98, Del.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich.
Pennsylvania Salt Mfg. Co., Dept. S, Pennsalt Cleaner Div., Philadelphia 7, Pa.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

METAL CLEANING MACHINES

American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Bullard Co., The, Bridgeport 2, Conn.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Pangborn Corporation, Hagerstown, Md.
Salem Engineering Co., 714 S. Broadway, Salem, O.

METAL DUPLICATION (Without Dies)

O'Neil-Irwin Mfg. Co., 304 8th Ave., So., Lake City, Minn.

METAL FINISHES

Logan Platers, Inc., 555 Main St., N. Tonawanda, N. Y.
Rust-Oleum Corp., 2425 W. Oakton, Evanston, Ill.
Sturgis Products Co., Sturgis, Mich.

METAL POWDERS—See POWDER (Metal)

METAL WASHING EQUIPMENT

American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.

METALS (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Brass Co., The, Waterbury 88, Conn.
Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Bridgeport Brass Co., Bridgeport 2, Conn.
Bristol Brass Corp., The, Bristol, Conn.
Bunting Brass & Bronze Co., The, Toledo 9, O.
Cadman, A. W., Mfg. Co., 28th & Smallman Sts., Pittsburgh 22, Pa.
Copperweld Steel Co., Warren, O.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Harper, The, H. M. Co., 2646 Fletcher St., Chicago 18, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.
Penn Brass & Copper Co., Erie, Pa.
Permanente Metals Corp., 1924 Broadway, Oakland 12, Calif.
Revere Copper & Brass Inc., 230 Park Ave, New York 17, N. Y.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Riverside Metal Co., The, Riverside, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

METALS (Nonferrous—Corrosion & Abrasive Resistant)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Permanente Metals Corp., 1924 Broadway, Oakland 12, Calif.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

METALS (Prefinished)

American Nickeloid Co., 1310 Second St., Peru, Ill.

METALS (Silver Clad)

Handy & Harman, 82 Fulton St., New York 7, N. Y.

METERS (Gas)

Roots-Connersville Blower Corp., Connersville, Ind.

MICROMETERS

Brown & Sharpe Mfg. Co., Providence 1, R. I.

MILLING CUTTERS

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Kennametal, Inc., Latrobe, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.
O. K. Tool Co., Inc., The, Shelton, Conn.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

MILLING CUTTERS (Carbide Tipped)

Continental Tool Works Div. of Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Kennametal, Inc., Latrobe, Pa.
O. K. Tool Co., Inc., The, Shelton, Conn.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Tungsten Carbide Tool Co., Div. of Michigan Tool Co., Detroit, Mich.

MILLING MACHINE ATTACHMENTS

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Milling Machine Co., Cincinnati 9, O.
Giddings & Lewis Machine Tool Co. Fond Du Lac, Wis.
Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.

MILLING MACHINES

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Milling Machine Co., Cincinnati 9, O.

MILLING MACHINES (Cont'd.)

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Giddings & Lewis Machine Tool Co., Fond Du Lac, Wis.
Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.
Moline Tool Co., 102 20th St., Moline, Ill.
Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Van Norman Co., 3640 Main St., Springfield, Mass.

MILLING MACHINES (Milling and Centering Combined)

Jones & Lamson Machine Co., Springfield, Vt.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.

MILLS (Blooming, Universal, Plate, Sheet, Tin, Bar, Strip, Etc.)—See ROLLING MILL EQUIPMENT

MIXERS (Hot Metal)

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.

MIXING EQUIPMENT

Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.

MOLD PLUGS

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

MOLDING MACHINES

Eaton Manufacturing Co., Foundry Div., 9771 French Rd., Detroit 13, Mich.

MOLDS (Ingots)—See INGOT MOLDS

MOLYBDENUM

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

MONEL METAL (All Commercial Forms)

International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.

MONORAIL SYSTEMS

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Northern Engineering Works, 2615 Atwater Ave., Detroit 7, Mich.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

MOTION PICTURE EQUIPMENT

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

MOTOR CONTROLS

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Trumbull Electric Mfg. Co., The, Plainville, Conn.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

MOTOR-GENERATORS

Crocker-Wheeler Div. of Joshua Hendy Iron Works, Ampere 33, N. J.

MOTORS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Brown-Brockmeyer Co., The, P.O. Box 976, Dayton 1, O.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Crocker-Wheeler Div. of Joshua Hendy Iron Works, Ampere 33, N. J.
Delco Products Div., General Motors Corp., 329 E. First St., Dayton 1, O.
Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, O.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Lincoln Electric Co., The, Cleveland 1, O.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Reliance Electric & Eng. Co., 1088 Ivanhoe Rd., Cleveland 10, O.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.
Wesche, B. A., Electric Co., The, 1628 Vine St., Cincinnati 10, O.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

MOTORS (Hydraulic)

Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.

MOUNTINGS (Rubber)

Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

MUCK BAR

Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

NAILS (*Also stainless)

Alan Wood Steel Co., Conshohocken, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
*Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
*Columbia Steel Co., San Francisco 6, Cal.
*Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

NAILS (Coated & Galvanized)

Alan Wood Steel Co., Conshohocken, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp. Wire Div., 332 S. Michigan Ave., Chicago 4, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

NAME PLATES

Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

NIBBLING MACHINES

Campbell, Andrew C., Div. American Chain & Cable Co., Inc., Bridgeport 2, Conn.

NICKEL (All Commercial Forms)

International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.

NITRIDING

Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Pittsburgh Commercial Heat Treating Co., 49th St. & A.V.R.R., Pittsburgh 1, Pa.

NOZZLES

Aldrich Pump Co., The, 2 Gordon St., Allentown, Pa.
American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

NUTS (*Also Stainless)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
*Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Barium Steel & Forge, Inc., Canton 1, O.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
*Continental Screw Co., New Bedford, Mass.
*Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
*Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, Ohio.
*National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
*Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
*Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O.

NUTS (Acorn or Cap)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
U. S. Automatic Corp., Amherst, O.

NUTS (Castellated)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Acme Co., The, 170 E. 131 St., Cleveland 8, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.

NUTS (Clinch-Weld Type)

Mount Clemens Metal Products Co., P.O. Box 205, Mount Clemens, Mich.

NUTS (Internal Wrenching)

Allen, Mfg. Co., The, 135 Sheldon St., Hartford, 1, Conn.

NUTS (Machine Screw)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Continental Screw Co., New Bedford, Mass.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.

NUTS (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St. Pawtucket, R. I.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.

NUTS (Self Locking)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O.

NUTS (Semi-Finished)

Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, Ohio.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

NUTS (Spring—Tension)

Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O.

NUTS (Wing)

Aluminum Co. of America, 2212 Gulf Bldg., Pittsburgh 19, Pa.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Continental Screw Co., New Bedford, Mass.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

OFFICE EQUIPMENT

International Business Machines Corp., 590 Madison Ave., New York 22, N. Y.
Remington Rand Inc., Systems Div., 315 Fourth Ave., New York 10, N. Y.

OIL CUPS

Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

OIL (Industrial Fuel)

Allied Oil Co., Inc., Standard Bldg., Cleveland 13, O.

OIL SEALS

Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.
National Motor Bearing Co., Inc., Box 1030, Redwood City, Cal.

OILS (Compressor)

Cities Service Co., 60 Wall Tower, New York 5, N. Y.
Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Sinclair Refining Co., 630 Fifth Ave., New York 20, N. Y.
Texas Co., The, 135 East 42nd St., New York 17, N. Y.

OILS (Hydraulic)

Brooks Oil Co., 315 E. Carson St., Pittsburgh 19, Pa.
Cities Service Companies, 60 Wall Tower, New York 5, N. Y.
Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Stuart, D. A., Oil Co., Ltd., 2735½ S. Troy St., Chicago 23, Ill.
Sun Oil Co., Dept. 1, 1608 Walnut St., Philadelphia 3, Pa.
Texas Co., The, 135 E. 42nd St., New York 17, N. Y.
Tide Water Associated Oil Co., 17 Battery Place, New York 4, N. Y.

OILS (Lubricating)—See LUBRICANTS (Industrial)

OILS (Quenching)

Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Stuart, D. A., Oil Co., Ltd., 2735½ S. Troy St., Chicago 23, Ill.

OILS & COMPOUNDS (Cutting)

Allied Oil Co., Inc., Standard Bldg., Cleveland 13, O.
Cincool Div., Cincinnati Milling Machine Co., Cincinnati 9, O.
Cities Service Co., 60 Wall Tower, New York 5, N. Y.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Sinclair Refining Co., 630 Fifth Ave., New York 20, N. Y.
Stuart, D. A., Oil Co. Ltd., 2735½ S. Troy St., Chicago 23, Ill.
Sun Oil Co., Dept. 1, 1608 Walnut St., Philadelphia 3, Pa.
Texas Co., The, 135 East 42nd St., New York 17, N. Y.
Tide Water Associated Oil Co., 17 Battery Place, New York 4, N. Y.

OPEN-HEARTH FURNACES—See FURNACES (Open-Hearth)

OVENS (Baking & Drying)

Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Selas Corp., of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Trumbull Electric Mfg. Co., The, Plainville, Conn.
Wagner Litho Machinery Co., Hoboken, N. J.
Young Brothers Co., 6500 Mack Ave., Detroit 7, Mich.

OVENS (Coke, By-Product)

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

OVENS (Core and Mold)

Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

OVENS (Gas or Oil Heat)

Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

OVENS (Heat Treating, Annealing, Japanning, Tempering)

Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Electric Furnace Co., The, Salem, O.
Hagan, George J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Young Brothers Co., 6500 Mack Ave., Detroit 7, Mich.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

OXY-ACETYLENE WELDING AND CUTTING—See WELDING

OXYGEN

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Independent Engineering Co., 105 W. Second St., O'Fallon, Ill.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.

PACKAGING (Protective)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Gaylord Container Corp., 111 N. Fourth St., St. Louis 2, Mo.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PACKING (Asbestos or Rubber)

Goodrich, B. F., Co., The, Akron 18, O.
Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N.Y.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

PACKING (Carbon or Graphite)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

PACKINGS (Mechanical Leather)

Excelcior Leather Washer Mfg. Co., Rockford, Ill.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

PAINT (Alkali Resisting)

Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

PAINT (Aluminum)

Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

PAINT (Aluminum Pigment)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PAINT (Heaat Resisting, Rust Preventing, Priming)

Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

PAINT (Marking)

American Crayon Co., Sandusky, O.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

PAINT (Stick Form)

American Crayon Co., Sandusky, O.
Markal Co., 631 N. Western Ave., Chicago 12, Ill.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.

PAINT SPRAY EQUIPMENT

Binks Mfg. Co., 3124 W. Carroll Ave., Chicago 12, Ill.
Kellogg Div. of The American Brake Shoe Co., 97 Humbolt St., Rochester 9, N. Y.

PAINTING

Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh 1, Pa.

PAINTS, LACQUERS and VARNISHES (Industrial)

Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
National Lead Co., 111 Broadway, New York 6, N. Y.
Pittsburgh Plate Glass Co., Paint Div., 632 Duquesne Way, Pittsburgh 22, Pa.

PAPER (Sensitized Photocopying)

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Ozalid Products Div., General Aniline & Film Corp., Johnson City, N. Y.

PAPER (Tracing)

Post, Frederick, Co., The, 3650 N. Avondale Ave., Chicago 18, Ill.

PARTS (Precision)

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Atlas Chain & Mfg. Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Brandt, Charles T. Inc., 1700 Ridgely St., Baltimore 30, Md.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Paul & Beekman, Inc., 1801 Courtland St., Philadelphia 40, Pa.
Swallow Airplane Co., Inc., Wichita, Kans.

PARTS (Precision-Diesel)

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.

PERFORATED METAL

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Chicago Perforating Co., 2443 W. 24th Pl., Chicago 8, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., 171 York St., Rochester 11, N.Y.
Harrington & King Perforating Co., The, 5634 Fillmore St., Chicago 44, Ill.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

PHENOL RECOVERY PLANTS

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh, 19, Pa.

PHOSPHOR BRONZE—See METALS (Nonferrous)

PHOTO TEMPLATE EQUIPMENT

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

PHOTOGRAPHIC EQUIPMENT AND SUPPLIES

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

PICKERS (Vacuum and Mechanical)

Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

PICKLING

Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh 1, Pa.

PICKLING COMPOUNDS

Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

PICKLING EQUIPMENT

International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.

PICKLING MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Wean Engineering Co., Inc., The, Warren, O.

PICKLING TANK LININGS

Ceilcote Co., 750 Rockefeller Bldg., Cleveland 13, O.
Goodrich, B. F., Co., The, Akron 18, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
National Lead Co., 111 Broadway, New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

PICKLING TANKS—See TANKS (Pickling)

PIERCER POINTS

Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown 1, O.

PIG CASTING MACHINES

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.

PIG IRON

Alan Wood Steel Co., Conshohocken, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Pickands Mather & Co., Union Commerce Bldg., Cleveland 14, O.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Samuel, Frank & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.
Shenango Furnace Co., Oliver Bldg., Pittsburgh 22, Pa.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh 22, Pa.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

PIG IRON (Silvery)

Jackson Iron & Steel Co., Jackson, O.
Keokuk Electro-Metals Co., Keokuk, Ia.
Miller & Co., 332 S. Michigan Ave., Chicago 4, Ill.

PILING (Iron and Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Foster, L. B., Co., Inc., P.O. Box 1647, Pittsburgh 30, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Weirton Steel Co., Weirton, W. Va.

PILING (Pipe)

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

PILING (Pressure-Treated Wood)

Koppers Co., Wood Preserving Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

PILLOW BLOCKS (Anti-Friction)

Dodge Manufacturing Corp., Mishawaka, Ind.
Medart Co., The, 3500 Dekalb St., St. Louis 18, Mo.

PILLOW BLOCKS (Anti-Friction) (Cont'd.)

SKF Industries, Inc., Philadelphia 32, Pa.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

PINIONS (Mill)

Bethlehem Steel Co., Bethlehem, Pa.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
National Erie Corp., Erie, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh 22, Pa.

PINS (Case Hardened or Heat Treated)

Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
U. S. Automatic Corp., Amherst, O.

PINS (Taper)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Moltrup Steel Products Co., Beaver Falls, Pa.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.

PIPE (Alloy) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
*Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
International Rolling Mill Products Co., Nikoh Tube Co., Div., 5033 S. Kedzie Ave., Chicago 32, Ill.
*National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.

PIPE (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PIPE (Brass, Bronze or Copper)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

PIPE (Lead or Lead Lined)

National Lead Co., 111 Broadway, New York 6, N. Y.

PIPE (Non-Metallic)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

PIPE (Rubber Lined)

Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

PIPE (Square and Rectangular)

International Rolling Mill Products Co., Nikoh Tube Co., Div., 5033 S. Kedzie Ave., Chicago 32, Ill.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

PIPE (Steel)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh 30, Pa.
International Rolling Mill Products Co., Nikoh Tube Co., Div., 5033 S. Kedzie Ave., Chicago 32, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

PIPE (Steel, Fabricated)

Power Piping Div. of Blaw-Knox Co., Beaver & Western Ave., Pittsburgh 2, Pa.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.

PIPE (Vitrified Clay)

Robinson Clay Products Co., The, 1100 Second National Bank Bldg., Akron 8, Ohio.

PIPE BALLS

Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown 1, O.

PIPE BENDING

Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
Power Piping Div. of Blaw-Knox Co., Beaver & Western Ave., Pittsburgh 2, Pa.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.

PIPE CUTTING AND THREADING MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.
Landis Machine Co., Waynesboro, Pa.

PIPE DRIVERS

American Hoist & Derrick Co., St. Paul. 1, Minn.

PIPE FITTINGS

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.

PIPE LINES (Riveted or Welded)

Bethlehem Steel Co., Bethlehem, Pa.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.

PIPE LINES (Seamless)

National Tube Co., Frick Bldg., Pittsburgh 30, Pa.

PIPE MILL MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
American Electric Fusion Corp., 2610 W. Diversey Parkway, Chicago 47, Ill.
Salem Engineering Co., 714 S. Broadway, Salem, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

PIPE STRAIGHTENING MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Guide Co., Canfield, O.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

PIPE TOOLS

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Greenfield Tap & Die Corp., Greenfield, Mass.

PIPE AND TUBE BENDING MACHINES

Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
Williams, White & Co., 801 Third Ave., Moline, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

PIPING CONTRACTORS

Power Piping, Div. of Blaw-Knox Co., Beaver and Western Ave., Pittsburgh 2, Pa.

PISTON RINGS

American Hammered Piston Ring Div., Koppers Co., Baltimore 3, Md.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

PISTON RODS

Bliss & Laughlin Inc., Harvey, Ill.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Republic Steel Corp., Union Drawn Steel Div., Massillon, O.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.

PISTONS (Aluminum, Gray Iron)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.

PLANERS

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O. Philadelphia 42, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.

PLATE CASTERS

Hyatt Bearings Div., General Motors Corp., Harrison, N. J.

PLATE PRESSING (Heavy)

Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.

PLATES (Alloy Steel)

Lukens Steel Co. and Divisions, Coatesville, Pa.

PLATES (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Permanente Metals Corp., 1924 Broadway, Oakland 12, Calif.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PLATES (Sheared or Universal) (*Also Stainless)

*Alan Wood Steel Co., Conshohocken, Pa.
*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
*American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Avondale Marine Ways, Inc., Westwego, La.
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Columbia Steel Co., San Francisco 6, Calif.
Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia 25, Pa.
Granite City Steel Co., Granite City, Ill.
Holliday, W. J., & Co., Hammond, Ind.
*Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The 67 Wall St., New York 5, N. Y.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
*Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
*Republic Steel Corp., Republic Bldg., Cleveland 1, O.
*Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Worth Steel Co., Claymont, Del.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

PLATES (Stainless Clad)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Granite City Steel Co., Granite City, Ill.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.

PLATES (Steel—Floor)—See FLOORING (Steel)

PLATES (Terne and Tin)—See TIN or TERNE PLATE

PLATING EQUIPMENT

Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Heil Process Equipment Co., 12903 Elmwood Ave., Cleveland 11, O.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

PLATING SUPPLIES

du Pont de Nemours, E. I. & Co., Inc., Wilmington 98, Del.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y.

PLIERS (Toggle)
Lapeer Mfg. Co., 2906 W. Grand Blvd., Detroit 2, Mich.

PLUGS (Expansion)
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

PLUGS (Rolling Mill)
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown 1, O.

POLE LINE MATERIAL
Bethlehem Steel Co., Bethlehem, Pa.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.

POLES (Tubular Steel)
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.

PORTABLE TOOLS AND ACCESSORIES
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Keller Tool Co., Grand Haven, Mich.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.

POTENTIOMETERS
Bristol Co., The, Waterbury 91, Conn.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.

POTS (Case Hardening)
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.

POTS (Melting)
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.

POWDERS, METAL (Iron, Lead Brass & Copper)
Glidden Co., The Berea Rd. & Madison Ave., Cleveland 2, O.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

POWER UNITS (Diesel Gasoline, Steam)
Power Plants Inc., 1755 E. 33rd St., Cleveland 14, O.
Ready-Power Co., The, 3824 Grand River Ave., Detroit 8, Mich.

POWER UNITS (Gasoline, Electric, for Industrial Trucks)
Power Plants, Inc., 1755 E. 33rd St., Cleveland 14, O.
Ready-Power Co., The, 3824 Grand River Ave., Detroit 8, Mich.

PREHEATERS
Salem Engineering Co., 714 S. Broadway, Salem, O.

PRESS BRAKES
Airtherm Manufacturing Co., 700 S. Spring Ave., St. Louis 10, Mo.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Cincinnati Shaper Co., The, Hopple, Garrard and Elam Sts., Cincinnati 25, O.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.
Columbia Machinery & Engineering Corp., Hamilton, O.
Ferracute Machine Co., Bridgeton, N. J.
Guide Co., Canfield, O.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

PRESSED METAL PARTS
American Brass Co., The, Waterbury 88, Conn.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Budd Co., The, 25th St. & Hunting Park Ave., Philadelphia 32, Pa.
By-Products Steel Co. Div. of Lukens Steel Co., Coatesville, Pa.
Logan Platers, Inc., 555 Main St., N. Tonawanda, N. Y.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Stanley Works, The, Pressed Metal Div., New Britain, Conn.
Worcester Pressed Steel Co., 501 Barber Ave., Worcester 6, Mass.

PRESSES
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O. Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak St., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Colonial Broach Co., P. O. Box No. 37, Harper Sta., Detroit 13, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Ferracute Machine Co., Bridgeton, N. J.
Galland-Henning Manufacturing Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Kux Machine Co., 3930 W. Harrison St., Chicago 24, Ill.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Johnson Machine & Press Corp., 620 W. Indiana Ave., Elkhart, Ind.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Warren City Mfg. Co., Warren, O.
Williams, White & Co., 801 Third Ave., Moline, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

PRESSES (Bending)
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Ferracute Machine Co., Bridgeton, N. J.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Johnson Machine & Press Corp., 620 W. Indiana Ave., Elkhart, Ind.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Williams, White & Co., 801 Third Ave., Moline, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES (Extrusion)
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Johnson Machine & Press Corp., 620 W. Indiana Ave., Elkhart, Ind.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

PRESSES (Forging)
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bigwood, Joshua, & Son Ltd., Wolverhampton, England.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Erie Foundry Co., Erie, Pa.
Ferracute Machine Co., Bridgeton, N. J.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Hydropress Inc., 570 Lexington Ave., New York 22, N. Y.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
National Machinery Co., The, Tiffin, O.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Williams, White & Co., 801 Third Ave., Moline, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

PRESSES (Forming and Braking)
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Cincinnati Shaper Co., The, Hopple, Garrard and Elam Sts., Cincinnati 25, O.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.
Erie Foundry Co., Erie, Pa.
Ferracute Machine Co., Bridgeton, N. J.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Johnson Machine & Press Corp., 620 W. Indiana Ave., Elkhart, Ind.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES (Hydraulic)
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Chambersburg Engineering Co., Chambersburg, Pa.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Colonial Broach Co., P. O. Box No. 37, Harper Sta., Detroit 13, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Galland-Henning Manufacturing Co. 2747 S. 31st St., Milwaukee 7, Wis.
Guide Co., Canfield, O.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Corp., Chicago 24, Ill.
Harris Foundry & Machine Co., Cordele, Ga.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Kux Machine Co., 3930 W. Harrison St., Chicago 24, Ill.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
National Erie Corp., Erie, Pa.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Williams, White & Co., 801 Third Ave., Moline, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Sq., Philadelphia 5, Pa.

PRESSES (Pneumatic)
Hannifin Corp., Chicago 24, Ill.

PRESSES (Powder Metallurgy)
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P.O., Philadelphia 42, Pa.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Kux Machine Co., 3930 W. Harrison St., Chicago 24, Ill.

PRESSES (Punching, Drawing, Coining, Blanking, etc.)
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Erie Foundry Co., Erie, Pa.
Ferracute Machine Co., Bridgeton, N. J.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Johnson Machine & Press Corp., 620 W. Indiana Ave., Elkhart, Ind.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.

PRESSES (Punching, Drawing, Coining, Blanking, etc) (Cont'd.)

Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Williams, White & Co., 801 Third Ave., Moline, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES (Riveting)

Ferracute Machine Co., Bridgeton, N. J.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Corp., Chicago 24, Ill.
Williams, White & Co., 801 Third Ave., Moline, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

PRESSES (Stamping)

Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Ferracute Machine Co., Bridgeton, N. J.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Williams, White & Co., 801 Third Ave., Moline, Ill.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES (Wax)

Bethlehem Steel Co., Bethlehem, Pa.

PRESSES, BRIQUETTING (Hydraulic)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P.O., Philadelphia 42, Pa.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Kux Machine Co., 3930 W. Harrison St., Chicago 24, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

PRESSURE VESSELS

Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.

PROCESS ENGINEERING

Atlas Chain & Mfg. Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Lombard Corp., Empire Bldg., Youngstown 3, O.
Pioneer Engineering & Mfg. Co., 19662 John R St., Detroit 3, Mich.

PROTECTIVE PLASTIC COATINGS

Better Finishes & Coatings Inc., 268 Doremus Ave., Newark 5, N. J.

PUG MILLS

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.

PULLEYS (Magnetic)

Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.

PULLEYS (Pressed Steel)

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Dodge Mfg. Corp., Mishawaka, Ind.
Toledo Stamping & Mfg. Co., 90 Fearing Blvd., Toledo 7, O.
Worcester Pressed Steel Co., 501 Barber Ave., Worcester 6, Mass.

PULLEYS (Variable Speed)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Lovejoy Flexible Coupling Co., 5071 W. Lake St., Chicago 44, Ill.

PULVERIZERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Pulverizer Co., 1539 Macklind Ave., St. Louis 10, Mo.

PUMPS

Aldrich Pump Co., The, 2 Gordon St., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Gardner-Denver Co., Williamson & Front Sts., Quincy, Ill.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Ingersoll-Rand Co., 11 Broadway New York 4, N. Y.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
Oil Well Supply Co., Dallas 1, Tex.
Weinman Pump & Supply Co., The, 207-209 Blvd. of the Allies, Pittsburgh 22, Pa.

PUMPS (Boiler Feed)

Aldrich Pump Co., The, 2 Gordon St., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
DeLaval Steam Turbine Co., Trenton 2, N. J.
Gardner-Denver Co., Williamson & Front Sts., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

PUMPS (Centrifugal)

Aldrich Pump Co., The, 2 Gordon St., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
DeLaval Steam Turbine Co., Trenton 2, N. J.
Gardner-Denver Co., Williamson & Front Sts., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

PUMPS (Fuel Injection)

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.

PUMPS (Gas)

Roots-Connersville Blower Corp., Connersville, Ind.

PUMPS (High Pressure)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
DeLaval Steam Turbine Co., Trenton 2, N. J.
Gardner-Denver Co., Williamson & Front Sts., Quincy, Ill.
Hydropress, Ind., 570 Lexington Ave., New York 22, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

PUMPS (Hydraulic)

Aldrich Pump Co., The, 2 Gordon St., Allentown, Pa.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P.O., Philadelphia 42, Pa.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
DeLaval Steam Turbine Co., Trenton 2, N. J.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Galland-Henning Manufacturing Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Hydropress Inc., 570 Lexington Ave., New York 22, N. Y.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Wood, R. D., Co., Public Ledger Bldg., Independence Sq., Philadelphia 5, Pa.

PUMPS (Lubricating)

Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

PUMPS (Reciprocating)

Aidrich Pump Co., The, 2 Gordon St., Allentown, Pa.
Gardner-Denver Co., Williamson & Front Sts., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

PUMPS (Rotary)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
DeLaval Steam Turbine Co., Trenton 2, N. J.
Independent Pneumatic Tool Co., 630 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Roots-Connersville Blower Corp., Connersville, Ind.

PUMPS (Vacuum)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Gardner-Denver Co., Williamson & Front Sts., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Roots-Connersville Blower Corp., Connersville, Ind.

PUMPS (Vertical Turbine)

DeLaval Steam Turbine Co., Trenton 2, N. J.
Layne & Bowler, Inc., Memphis 8, Tenn.

PUNCHES (Multiple)

Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Cincinnati Shaper Co., The, Hopple, Garrand and Elam Sts., Cincinnati 25, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Ferracute Machine Co., Bridgeton, N. J.
Hannifin Corp., Chicago 24, Ill.
Thomas Machine Mfg. Co., Etna Branch P.O., Pittsburgh 23, Pa.
Williams, White & Co., 801 Third Ave., Moline, Ill.

PUNCHES (Piercing, Interchangeable)

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Marchant, George F., Co., 1420 S. Rockwell St., Chicago 8, Ill.
Whistler, S. B., & Sons, Inc., 748-756 Military Rd., Buffalo 7, N. Y.

PUNCHING AND SHEARING MACHINERY

Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Chamberburg Engineering Co., Chamberburg, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Ferracute Machine Co., Bridgeton, N. J.
Hannifin Corp., Chicago 24, Ill.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Thomas Machine Mfg. Co., Etna Branch P.O., Pittsburgh 23, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Williams, White & Co., 801 Third Ave., Moline, Ill.

PYROMETER TUBES

Bristol Co., The, Waterbury 91, Conn.
Carborundum Co., The, Niagara Falls N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
McDanel Refractory Porcelain Co., Beaver Falls, Pa.
Norton Company, Worcester 6, Mass.

PYROMETERS

American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.
Bristol Co., The, Waterbury 91, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.

RADIATORS (Heating—Cast Iron)

Utica Radiator Corp., 2201 Dwyer Ave., Utica 2, N. Y.

RAIL BREAKERS

United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Williams, White & Co., 801 Third Ave., Moline, Ill.

RAILS (New and Relaying)

Foster, L. B., Co., Inc., P.O. Box 1647, Pittsburgh 30, Pa.
Midwest Steel Corp., Charleston, W. Va.
Rail & Industrial Equipment Co., 30 Church St., New York 7, N.Y.

RAILS (Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.

REAMERS

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Greenfield Tap & Die Corp., Greenfield, Mass.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
National Automatic Tool Co. Inc., S. 7th & N Sts., Richmond, Ind.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

REAMERS (Carbide Tipped)

Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Gisholt Machine Co., 1217 E. Washington St., Madison 3, Wis.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

REBUILT EQUIPMENT

Iron & Steel Products, Inc., Hegewisch Sta., Chicago 33, Ill.
West Penn Machinery Co., 1208 House Bldg., Pittsburgh 22, Pa.

RECORD FORMS

Remington Rand Inc., Systems Div., 315 Fourth Ave., New York 10, N. Y.

RECORD KEEPING SYSTEMS

International Business Machines Corp., 590 Madison Ave., New York 22, N. Y.
Remington Rand Inc., Systems Div., 315 Fourth Ave., New York 10, N. Y.

RECORDERS (Pressure, Speed, Temperature, Time)

Bristol Co., The Waterbury 91, Conn.
International Business Machines Corp., 590 Madison Ave., New York 22, N. Y.
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

RECTIFIERS (Dry Disc)

Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

RECTIFIERS (Mercury Arc)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

REDUCTION GEARS

American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29, Pa.
DeLaval Steam Turbine Co., Trenton 2, N. J.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
James, D. O., Gear Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Erie Corp., Erie, Pa.
Philadelphia Gear Works, Inc., Erie Ave., & G St., Philadelphia 34, Pa.
Warren City Mfg. Co., Warren, O.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

REELS (Automatc Centering)

Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.
Wittek Mfg. Co., 4305 W. 24th Place, Chicago 23, Ill.

REEELS (Coiling & Pay-Off)

Guide Co., Canfield, O.
Paxson Machine Co., Benton Rd., Salem, O.

REFRACTORIES (Chrome)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Dolomite)

Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Fire Clay)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Eureka Fire Brick Works, 1100 B. F. Jones Law Bldg., Pittsburgh 19, Pa.
Globe Brick Co., The, East Liverpool, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Robinson Clay Products Co., The, 1100 Second National Bank Bldg., Akron 8, O.

REFRACTORIES (Firestone)

Cleveland Quarries Co., The, 1740 E. 12th St., Cleveland 14, O.

REFRACTORIES (For High Frequency Furnaces)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Norton Co., Worcester 6, Mass.

REFRACTORIES (Forsterite)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (High Alumina)

Carborundum Co., The, Niagara Falls, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Insulating)

Carborundum Co., The, Niagara Falls, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

REFRACTORIES (Magnesia)

Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Norton Co., Worcester 6, Mass.

REFRACTORIES (Magnesite)

Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Plastic)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St. New York 16. N. Y.

REFRACTORIES (Silica)

Carborundum Co., The, Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Robinson Clay Products Co., The, 1100 Second National Bank Bldg., Akron 8, O.

REFRACTORIES (Silicon Carbide)

Bay State Abrasive Products Co., Union St., Westboro, Mass.
Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Norton Co., Worcester 6, Mass.

REFRACTORY CEMENT AND CONCRETE

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Carborundum Co., The, Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Norton Co., Worcester 6, Mass.

REGULATORS (Pressure)

Bristol Co., The, Waterbury 91, Conn.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

REGULATORS (Temperature)

Bristol Co., The, Waterbury 91, Conn.
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

REGULATORS (Voltage)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
General Electric Co., Schenectady 5, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

REGULATORS (Welding & Cutting)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

REINFORCEMENT FABRIC (Electric Welded)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

RELAYS (Magnetic)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Trumbull Electric Mfg. Co., The, Plainville, Conn.

RESISTORS (Alloy Grid or Wire Wound—Electric)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

RESISTORS (Graphite Disc)

Allen-Bradley Co., 1316 S. 2nd St., Milwaukee 4, Wis.

RESPIRATORS

Scott Aviation Corp., Lancaster, N. Y.
Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

RHEOSTATS

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The. 2698 E. 79th St., Cleveland 4, O.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

RINGS (Aluminum, Brass, Bronze)

National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

RINGS (Steel)

American Welding & Mfg. Co., The, Warren, O.
By-Products Steel Co., Div. of Lukens Steel Co., Coatesville, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

RINGS (Weldless) (*Also Stainless)

*Jessop Steel Co., 584 Green St., Washington, Pa.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.

RIVET SETS

Marchant, George F., Co., 1420 S. Rockwell St., Chicago 8, Ill.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.

RIVETERS (Hydraulic—Portable and Stationary)

Hanna Engineering Works 1765 Elston Ave., Chicago 22, Ill
Hannifin Corp., Chicago 24, Ill.

RIVETERS (Pneumatic)

Cleco Div. of the Reed Roller Bit Co., P.O. Box 2119 Houston 1, Tex.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Corp., Chicago 24, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Keller Tool Co., Grand Haven, Mich.

RIVETING MACHINERY

Chambersburg Engineering Co., Chambersburg, Pa.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.
Williams, White & Co., 801 Third Ave., Moline, Ill.

RIVETS (*Also Stainless)

*Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
*Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
*National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
*Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
*Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
*Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

RIVETS (Blind)

Clark Equipment Co., Buchanan, Mich.

RIVETS (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
*Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

RODS (Alloy)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Copperweld Steel Co., Warren, O.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.

RODS (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

RODS (Brass, Bronze, Phosphor Bronze, Silicon Bronze, Copper, Nickel Silver)

American Brass Co., The, Waterbury 88, Conn.

RODS (Brass, Bronze, Phosphor Bronze, Silicon Bronze, Copper, Nickel Silver) (Cont'd.)

Bridgeport Brass Co., Bridgeport 2, Conn.
Bristol Brass Corp., The, Bristol, Conn.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17,N.Y.
Riverside Metal Co., The, Riverside, N. J.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Seymour Manufacturing Co., The, 51 Franklin St., Seymour, Conn.
Titan Metal Mfg. Co., Bellefonte, Pa.

RODS (Drill)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Anchor Drawn Steel Co., Latrobe, Pa.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Jessop Steel Co., 584 Green St. Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.

RODS (Iron and Steel)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.

RODS (Rounds, Flats and Shapes) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Copperweld Steel Co., Warren, O.
*Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
*Follansbee Steel Corp., Pittsburgh 30, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
*United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Washburn Wire Co., Phillipsdale, R. I.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

RODS (Threaded)

Bethlehem Steel Co., Bethlehem, Pa.
Central Screw Co., Chicago 9, Ill.
Continental Screw Co., New Bedford, Mass.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Russell, Burdsall, & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

RODS (Wire)—See WIRE PRODUCTS

ROLL FORMING MACHINES

Etna Machine Co., The, 3400 Maplewood Ave., Toledo 10, O.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

ROLL HEATERS—See HEATERS (Electric Roll)

ROLLING DOORS & SHUTTERS—See DOORS AND SHUTTERS

ROLLING MILL BEARINGS—See BEARINGS (Rolling Mill)

ROLLING MILL ENGINEERS (Consulting and Contracting)

Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

ROLLING MILL EQUIPMENT

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Alliance Machine Co., The, Alliance, O.
Bigwood, Joshua, & Son Ltd., Wolverhampton, England.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Guide Co., Canfield, O.
Hallden Machine Co., The, Thomaston, Conn.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
Morgan Construction Co., Worcester 5, Mass.
Morgan Engineering Co., The, Alliance, O.
Paxson Machine Co., Benton Rd., Salem, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wean Engineering Co., Inc., The, Warren, O.

ROLLING MILL MACHINERY (Used)

Foster, Frank B., Inc., 829 Oliver Bldg., Pittsburgh, Pa.

ROLLING MILL TABLES AND ROLLERS

Guide Co., Canfield, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.

ROLLS (Bending and Straightening)

American Roller Die Corp., 20500 St. Clair Ave., Cleveland 17, O.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P.O., Philadelphia 42, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Guide Co., Canfield, O.
Hannifin Corp., Chicago 24, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Wean Engineering Co., Inc., The, Warren, O.
Webb Corp., The, Webb City, Mo.
Williams, White & Co., 801 Third Ave., Moline, Ill.

ROLLS (Forming)

American Roller Die Corp., 20500 St. Clair Ave., Cleveland 17, O.
Williams, White & Co., 801 Third Ave., Moline, Ill.

ROLLS (Iron and Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyde Park Fdry. and Machine Co., Hyde Park, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P.O. Box 1466, Pittsburgh 30, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Pittsburgh Rolls Div., Blaw-Knox Co., Pittsburgh 1, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

ROLLS (Nonferrous)

National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

ROLLS (Sand and Chilled)

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P.O. Box 1466 Pittsburgh 30, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Pittsburgh Rolls Div. of Blaw-Knox Co., Pittsburgh 1, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.

ROLLS (Tinning Machine)

American Roller Die Corp., 20500 St. Clair Ave., Cleveland 17, O.
American Shear Knife Co., P.O. Box 355, Homestead, Pa.
Wean Engineering Co., Inc., The, Warren, O.

ROOFING (Plastic and Liquid)

Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

ROOFING, SIDING & FLASHING

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Permanente Metals Corp., 1924 Broadway, Oakland 12, Calif.

ROOFING AND SIDING (Corrugated & Plain)

Airtherm Manufacturing Co., 700 S. Spring Ave., St. Louis 10, Mo.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.
Permanente Metals Corp., 1924 Broadway, Oakland 12, Calif.
Reliance Steel Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.

RUBBER GOODS (Industrial)

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Goodrich, B. F., Co., The, Akron 18, O.
Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N. Y.
National Motor Bearing Co., Inc., Box 1030, Redwood City, Cal.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

RUBBER LINING (Hard and Soft)

United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

RUST PREVENTIVES

Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Rust-Oleum Corp., 2425 W. Oakton, Evanston, Ill.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

RUST PROOFING PROCESSES AND EQUIPMENT

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Enterprise Galvanizing Co., 2525 E. Cumerland St., Philadelphia 25, Pa.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Mahon, R. C., Co., The, 8650 Mt. Eliott Ave., Detroit 11, Mich.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Oakite Products Inc., 34E Thames St. New York 6, N. Y.
Parker Rust Proof Co., 2158 E. Milwaukee Ave., Detroit 11, Mich.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

SAFE ENDS (Boiler Tube)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.

SAFETY DEVICES (Electric)

Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

SAFETY EQUIPMENT

Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Scott Aviation Corp., Lancaster, N. Y.
Welding Engineering Co., 264 E. Ogden Ave., Milwaukee 2, Wis.
Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

SAND BLAST EQUIPMENT

American Whelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.
Vacu-Blast Co., Inc., 350 Peninsular Ave., San Mateo, Calif.
Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

SAND CONDITIONING AND PREPARING MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.

SANDERS (Portable)

Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.

SAWING MACHINES (Contour)

DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.

SAWING MACHINES (Hack)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.

SAWING MACHINES (Hot and Cold)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.
Morgan Engineering Co., The, Alliance, O.
Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wells Mfg. Corp., 1515 Filmore St., Three Rivers, Mich.

SAWS (Band—Metal Cutting)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 89, Ill.
Disston, Henry, & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Thompson, Henry G., & Son Co., New Haven 5, Conn.
Wells Mfg. Corp., 1515 Filmore St., Three Rivers, Mich.

SAWS (Hack)

Armstrong-Blum Mfg. Co., 3700 Bloomingdale Ave., Chicago 39, Ill.
Disston, Henry, & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Thompson, Henry G., & Son Co., New Haven 5, Conn.

SAWS (Hot & Cold)

Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, O.

SAWS (Inserted Tooth, Cold)

Disston, Henry, & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

SAWS (Metal Cutting)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Disston, Henry, & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.
Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, O.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Thompson, Henry G., & Son Co., New Haven 5, Conn.
Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.
Wells Mfg. Corp., 1515 Filmore St., Three Rivers, Mich.

SAWS (Segmental)

Disston, Henry, & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.
Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, O.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

SAWS (Woodworking)

Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.

SCALES

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.

SCALES (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

SCRAP IRON & STEEL

Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.

SCREENS (Vibrating)

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
Robins Conveyors, Inc., Div. of Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.

SCREENS AND SIEVES

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Chicago Perforating Co., 2443 W. 24th Pl., Chicago 8, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Harrington & King Perforating Co., The, 5634 Fillmore St., Chicago 44, Ill.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Koppers Co., Engineering & Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Robins Conveyors, Inc., Div. of Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SCREW EXTRACTORS

Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Greenfield Tap & Die Corp., Greenfield, Mass.

SCREW MACHINE PRODUCTS

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Eastern Machine Screw Corp., Truman & Barclay Sts., New Haven 6, Conn.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Hindley Mfg. Co., Valley Falls, R. I.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
New Britain Machine Co., New Britain, Conn.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Titan Metal Mfg. Co., Bellefonte, Pa.
Tourek, J. J., Mfg. Co., 4701-11 West 16th St., Chicago 50, Ill.
U. S. Automatic Corp., Amherst, O.

SCREW MACHINES (Automatic, Single and Multiple Spindle)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cleveland Automatic Machine Co., The, 4932 Beech St., Cincinnati 12, O.
Cone Automatic Machine Co., Inc., Windsor, Vt.
Greenlee Bros. & Co., 1927 Mason Ave., Rockford, Ill.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
New Britain Machine Co., New Britain, Conn.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.

SCREW PLATES

Greenfield Tap & Die Corp., Greenfield, Mass.

SCREW STOCK—See STEEL (Screw Stock)

SCREWDRIVERS (Power)

Detroit Power Screwdriver Co., 2813 W. Fort St., Detroit 16, Mich.
Keller Tool Co., Grand Haven, Mich.
Van Dorn Electric Tool Co., The, 720 Joppa Rd. Towson 4, Md.

SCREWS (Cap, Set, Safety-Set)

Allen Mfg. Co., The, 135 Sheldon St., Hartford 1, Conn.
Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bristol Co., The, Waterbury 91, Conn.
Chandler Products Corp., Euclid 17, O.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Republic Steel Corp., Bolt and Nut Div., 1970 Carter Rd., Cleveland 13, O.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.

SCREWS (Cold Headed)

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
American Screw Co., Providence 1, R. I.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Chandler Products Corp., Euclid 17, O.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Republic Steel Corp., Bolt and Nut Div., 1970 Carter Rd., Cleveland 13, O.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

SCREWS (Conveyor)

Lee Spring Co., Inc., 30 Main St., Brooklyn 1, N. Y.

SCREWS (Hardened Metallic Drive)

American Screw Co., Providence 1, R. I.
Continental Screw Co., New Bedford, Mass.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.

SCREWS (Hardened Self-Tapping)

American Screw Co., Providence 1, R. I.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Continental Screw Co., New Bedford, Mass.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

SCREWS (Lag)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Russell, Burdsall, & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

SCREWS (Machine)

American Screw Co., Providence 1, R. I.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Continental Screw Co., New Bedford, Mass.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.

SCREWS (Machine, Recessed Head)

American Screw Co., Providence 1, R. I.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bristol Co., The, Waterbury 91, Conn.
Central Screw Co., Chicago 9, Ill.
Chandler Products Corp., Euclid 17, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit 4, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
New England Screw Co., Keene, N. H.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

SCREWS (Machine, Recessed Head) (Cont'd.)

Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.

SCREWS (Nonferrous and Stainless)

Aluminum Co. of America., 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Screw Co., Providence 1, R. I.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Continental Screw Co., New Bedford, Mass.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Harper, H. M. Co., The, 2646 Fletcher St., Chicago 18, Ill.
Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
Tourek, J. J., Mfg. Co., 4701-11 West 16th St., Chicago 50, Ill.

SCREWS (Sheet Metal, Recessed Head)

American Screw Co., Providence 1, R. I.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bristol Co., The, Waterbury 91, Conn.
Central Screw Co., Chicago 9, Ill.
Chandler Products Corp., Euclid 17, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Pheoli Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Shakeproof Lock Washer Co., Chicago, Ill.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

SCREWS (Socket, Cold Forged)

Allen Mfg. Co., The, 135 Sheldon St., Hartford 1, Conn.
Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.
Bristol Co., The, Waterbury 91, Conn.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

SCREWS (Tap)

Continental Screw Co., New Bedford, Mass.

SCREWS (Thread Cutting)

American Screw Co., Providence 1, R. I.
Continental Screw Co., New Bedford, Mass.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

SCREWS (Thread Locking)

Continental Screw Co., New Bedford, Mass.

SCREWS (Thumb)

National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

SCREWS (Valve Tappet)

Chandler Products Corp., Euclid 17, O.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
U. S. Automatic Corp., Amherst, O.

SCREWS (Wood, Recessed Head)

American Screw Co., Providence 1, R. I.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bristol Co., The, Waterbury 91, Conn.
Chandler Products Corp., Euclid 17, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker, Charles, Co., The, Meriden, Conn.
Pheoli Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Southington Hardware Mfg. Co., Southington, Conn.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
Whitney Screw Co., Waterbury, Conn.

SCRUBBERS (Gas or Air)—See GAS SCRUBBERS

SEALING COMPOUNDS

Dewey & Almy Chemical Co., Cambridge 40, Mass.

SEALS (Oil and Grease)

Goodrich, B. F., Co., The, Akron 18, O.
National Motor Bearing Co., Inc., Box 1030, Redwood City, Cal.

SEAMLESS STEEL TUBING—See TUBING (Seamless Steel)

SEPARATORS (Magnetic)

Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Cutler-Hammer Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Dings Magnetic Separator Co., 4710 W. McGeogh Ave., Milwaukee 14, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.

SEWERAGE LINES (Vitrified Clay Pipe)

Robinson Clay Products Co., The, 1100 Second National Bank Bldg., Akron 8, O.

SHACKLES

Bethlehem Steel Co., Bethlehem, Pa.

SHAFT HANGERS—See HANGERS

SHAFTING

American Brass Co., The, Waterbury 88, Conn.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Republic Steel Corp., Union Drawn Steel Div., Massillon, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Ward's, Edgar T., Sons Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Wisconsin Steel Co., 180 N. Michigan Ave., Cnicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.

SHAFTING (Flexible)

Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

SHAPER-PLANERS

Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.

SHAPERS

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Cincinnati Shaper Co., The, Hopple, Garrard and Elam Sts., Cincinnati 25, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morton Mfg. Co., Muskegon Heights, Mich.
Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.

SHAPERS (Spindle)

Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

SHAPES (Deep Drawn)

Bethlehem Steel Co., Bethlehem, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.

SHAPES (Ferrous)

Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
By-Products Steel Co., Div. of Lukens Steel Co., Coatesville, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Republic Steel Corp., Union Drawn Steel Div., Massillon, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.

SHAPES (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Riverside Metal Co., The, Riverside, N. J.

SHAPES SPECIAL (Steel)

Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.

SHARPENING MACHINES (Hob, Cutter & Reamer)

Barber-Colman Co., 150 Loomis St., Rockford, Ill.

SHEAR BLADES

American Shear Knife Co., P. O. Box 355, Homestead, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Coes, Loring Co., Worcester, Mass.
Disston, Henry, & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Wapakoneta Machine Co., The, Wapakoneta, O.

SHEARS

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Beverly Shear Co., 3004 W. 111th St., Chicago 43, Ill.
Bigwood, Joshua, & Son Ltd., Wolverhampton, England.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Cincinnati Shaper Co., The, Hopple, Garrard and Elam Sts., Cincinnati 25, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Columbia Machinery & Engineering Corp., Hamilton, O.
Continental Foundry & Machine Co., Grant Bldg., Pittsburgh 19, Pa.
Guide Co., Canfield, O.
Hallden Machine Co., The, Thomaston, Conn.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Mesta Machine Co., P. O. Box 1466 Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
O'Neil-Irwin Mfg. Co., 304 8th Ave., S., Lake City, Minn.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Williams, White & Co., 801 Third Ave., Moline, Ill.

SHEARS (Portable)

Hannifin Corp., Chicago 24, Ill.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
O'Neil-Irwin Mfg. Co., 304 Eighth Ave., Lake City, Minn.
Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.

SHEARS (Throatless)

Beverly Shear Co., 3004 W. 111th St., Chicago 43, Ill.

SHEARS, ROTARY (Slitting, Beveling, Circling, Flanging)

Bigwood, Joshua, & Son Ltd., Wolverhampton, England.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Kling Bros. Engineering Works, 1328S N. Kostner Ave., Chicago 51, Ill.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Paxson Machine Co., Benton Rd., Salem, O.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Wapakoneta Machine Co., The, Wapakoneta, O.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

SHEAVES, V-BELT (Single & Multiple)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Dodge Mfg. Corp., Mashawaka, Ind.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Col.
Lovejoy Flexible Coupling Co., 5071 W. Lake St., Chicago 44, Ill.

SHEET BARS

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

SHEET LIFTERS AND CARRIERS

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Mansaver Industries Inc., 3101 East St., New Haven 3, Conn.

SHEET METAL PRODUCTS—See (Stamping)

SHEET METAL WORKERS MACHINES

Cincinnati Shaper Co., The, Hopple, Garrard and Elam Sts., Cincinnati 25, O.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.

SHEET STEEL PILING (New and Used)

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh 30, Pa.
Inland Steel Co., 33 S. Dearborn St., Chicago 3, Ill.

SHEETS (Acid Resisting)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Permanente Metals Corp., 1924 Broadway, Oakland 12, Calif.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Sharon Steel Corp., Sharon, Pa.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

SHEETS (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Permanente Metals Corp., 1924 Broadway, Oakland 12, Calif.
Reliance Steel Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

SHEETS (Black)

Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
Reliance Steel Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sharon Steel Corp., Sharon, Pa.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Brass, Bronze, Phosphor Bronze, Silicon, Bronze, Copper Nickel, Nickel Silver)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Bristol Brass Corp., The, Bristol, Conn.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17, N. Y.
Riverside Metal Co., The, Riverside, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Seymour Manufacturing Co., The, 51 Franklin St., Seymour, Conn.

SHEETS (Corrugated)

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

SHEETS (Deep Drawing and Stamping)

Alan Wood Steel Co., Conshohocken, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
Permanente Metals Corp., 1924 Broadway, Oakland 12, Calif.
Reliance Steel Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sharon Steel Corp., Sharon, Pa.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Electrical)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Granite City Steel Co., Granite City, Ill.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos. T., & Son., Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Electrolytic Zinc Coated)

American Nickeloid Co., 1310 Second St., Peru, Ill.
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Weirton Steel Co., Weirton, W. Va.

SHEETS (Enameling)

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

SHEETS (Galvanized)

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Reliance Steel Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sharon Steel Corp., Sharon, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

SHEETS (High Finished)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Rolling Mill Co., The, Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The Youngstown 1, O.

SHEETS (Hot Rolled and Hot Rolled, Pickled and Annealed)

Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Disston, Henry, & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa.
Reliance Steel Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sharon Steel Corp., Sharon, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Worth Steel Co., Claymont, Del.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Lead or Lead Alloy Coated)

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
National Lead Co., 111 Broadway, New York 6, N. Y.
Sharon Steel Corp., Sharon, Pa.
Weirton Steel Co., Weirton, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

SHEETS (Long Terne)

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Reliance Steel Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Ryerson, Jos. T., & Son., Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Perforated)

Diamond Mfg. Co., Wyoming, Pa.
Harrington & King Perforating Co., The, 5634 Filmore St., Chicago 44, Illl.

SHEETS (Roofing)—See ROOFING AND SIDING (Corrugated and Plain)

SHELLS (Seamless Drawn)

Paul & Beekman, Inc., 1801 Courtland St., Philadelphia 40, Pa.

SHEETS (Stainless)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
McLouth Steel Corp., 300 S. Livernois Ave., Detroit, Mich.
Republic Steel Corp., Alloy Steel Div., Massillon, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sharon Steel Corp., Sharon, Pa.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Washington Steel Corp., 9 E. Beau St., Washington, Pa.

SHEETS (Stainless Clad)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Granite City Steel Co., Granite City, Ill.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.

SHEETS (Tin)—See TIN or TERNE PLATE

SHEETS (Tin Mill Black)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Granite City Steel Co., Granit City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHELLS (Seamless Drawn)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

SHIMS (Laminated)

Laminated Shim Co., Inc., 87 Union St., Glenbrook, Conn.
National Motor Bearing Co., Inc., Box 1030, Redwood City, Cal.

SHOES

Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.

SHOES (Foundry)

Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

SHOES (Safety)

Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.

SHOT (Peening)

American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.

SHOT AND GRIT

American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Clayton-Sherman Abrasives Co., Dept. C, 3896 Lonyo Rd., Detroit 10, Mich.
Pangborn Corporation, Hagerstown, Md.
Pittsburgh Crushed Steel Co., 4839 Harrison St., Pittsburgh 1, Pa.

SHOT BLASTING

American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.
Vacu-Blast Co., Inc., 350 Peninsular Ave., San Mateo, Calif.

SHOVELS (Power)

Michigan Power Shovel Co., Benton Harbor, Mich.
Northwest Engineering Co., 135 S. LaSalle St., Chicago 4, Ill.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Unit Crane & Shovel Co., 6411 W. Burnham St., Milwaukee 14, Wis.

SIEVES—See SCREENS AND SIEVES

SIGNS (Metal)

Webb Corp., The, Webb City, Mo.

SILICO-MANGANESE

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.
Samuel, Frank & Co., Inc Harrison Bldg., Philadelphia 2, Pa.

SILICON BRONZE

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.

SILICON METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Keokuk Electro-Metals Co., Keokuk, Ia.
Miller & Co., 332 S. Michigan Ave., Chicago 4, Ill.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N.Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

SKELP (Steel)

Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Laclede Steel Co., Arcade Bldg St. Louis, Mo.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

SKIP HOISTS (Materials Handling)

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Dempster Brothers, Inc., Knoxville 17, Tenn

SLAG GRANULATING MACHINES (Blast Furnace & Open Hearth)

Brosius, Edgar E., Co., Inc., Sharpsburg P.O., Pittsburgh 15, Pa.

SLEEVES (Piston, Pump & Shaft)

Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

SLEEVES AND EXTENSION SOCKETS

Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

SLITTERS

Bethlehem Steel Co., Bethlehem, Pa.
Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.
Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Paxson Machine Co., Benton Rd., Salem, O.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Wapakoneta Machine Co., The, Wapakoneta, O.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

SLOTTERS

Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.

SMALL TOOLS

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.

SOAKING PITS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.

SOLDER

Kester Solder Co., 4222 Wrightwood Ave., Chicago 39, Ill.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Lead Co., 111 Broadway, New York 6, N. Y.

SOLDER (Silver)

Handy & Harman, 82 Fulton St., New York 7, N. Y.

SOLDERING EQUIPMENT

Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Ideal Industries, Inc., Sycamore, Ill.
Lepel High Frequency Laboratories Inc., 39 W. 60th St., New York 23, N. Y.
Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

SOLENOIDS (Electric)

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.

SOLVENT (Degreasing)

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., Dept., S. Pennsalt Cleaner Div., Philadelphia 7, Pa.

SPECIAL MACHINERY—See MACHINERY (Special)

SPEED REDUCERS (Including Motorized)

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Cleveland Worm & Gear Co., The, 3270 E. 80th St., Cleveland 4, O.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Falk Corporation, The, Milwaukee 8, Wis.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote Bros., Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
James, D. O., Gear Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Jones, W. A., Fdry. & Mach. Co., 4437 W. Roosevelt Rd., Chicago 24, Ill.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Ottumwa Iron Works, Ottumwa, Ia.
Philadelphia Gear Works Inc., Erie Ave. & G St., Philadelphia 34, Pa.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

SPIEGELEISEN

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.
Samuel, Frank & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

SPIKES (Screw)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.

SPINDLES (Grinding)

Bryant Chucking Grinder Co., 257 Clinton St., Springfield, Vt.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.

SPLICE BARS (Rail)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.

SPINNING MACHINES

Guide Co., Canfield, O.

SPRAY BOOTHS

Binks Mfg. Co., 3124 W. Carroll Ave., Chicago 12, Ill.
Kellogg Div. of The American Brake Shoe Co., 97 Humbolt St., Rochester 9, N. Y.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Schmieg Industries, Inc., 298 Piquette Ave., Detroit 2, Mich.

SPRINGS (*Also Stainless)

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barium Steel & Forge, Inc., Canton 1, O.

•Barnes, Wallace, Co., Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Cuyahoga Spring Co., 10254 Berea Rd., Cleveland 2, Ohio.
•Gibson, William D. Co., The, Div. Associated Spring Corp., 1805 Clybourn Ave., Chicago 14, Ill.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Lee Spring Co., Inc., 30 Main St., Brooklyn 1. N. Y.
•Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N.Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Coil & Elliptic)

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
Barnes, Wallace, Co., Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Cuyahoga Spring Co., 10254 Berea Rd., Cleveland 2, O.
Gibson, William D. Co., The, Div. Associated Spring Corp., 1805 Clybourn Ave., Chicago 14, Ill.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Compression)

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace Co., Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Cuyahoga Spring Co., 10254 Berea Rd., Cleveland 2, O.
Gibson, William D. Co., The, Div. Associated Spring Corp., 1805 Clybourn Ave., Chicago 14, Ill.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Flat Coiled)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Athenia Steel Co., Clifton, N. J.
Barnes, Wallace Co., Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Cuyahoga Spring Co., 10254 Berea Rd., Cleveland 2, O.
Gibson, William D. Co., The, Div. Associated Spring Corp. 1805 Clybourn Ave., Chicago 14, Ill.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Washburn Wire Co., 118th & Harlem River, New York 35, N.Y.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Oil Tempered—Flat)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Athenia Steel Co., Clifton, N. J.
Barnes, Wallace, Co., Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Cuyahoga Spring Co., 10254 Berea Rd., Cleveland 2, O.
Gibson, William D. Co., The, Div. Associated Spring Corp., 1805 Clybourn Ave., Chicago 14, Ill.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Torsion)

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes Wallace Co., Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Cuyahoga Spring Co., 10254 Berea Rd., Cleveland 2, O.
Gibson, William D. Co., The, Div. Associated Spring Corp., 1805 Clybourn Ave., Chicago 14, Ill.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.

SPRINKLERS (Automatic)

"Automatic" Sprinkler Corp. of America, Brittain St., Youngstown 8, O.
Blaw-Knox Sprinkler Div., Blaw-Knox Co., Blawnox, Pa.

SPROCKETS

Union Chain & Mfg. Co., Sandusky, O.

SPRUE CUTTERS

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Ferracute Machine Co., Bridgeton, N. J.
Williams, White & Co., 801 Third Ave., Moline, Ill.

STACKS (Steel)—See BRIDGES, ETC.

STAINLESS STEEL—See listings marked "*" under individual product headings.

STAMPINGS

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
Aluminum Co., of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
American Tube & Stamping Plant, (Stanley Wks.), Bridgeport 7, Conn.
Atlas Metal Stamping Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Barium Steel & Forge, Inc., Canton 1, O.
Barnes, Wallace, Co., Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Budd Co., The, 25th St. & Hunting Park Ave., Philadelphia 32, Pa.
By-Products Steel Co., Div. of Lukens Steel Co., Coatesville, Pa.
Erdie Perforating Co., 171 York St., Rochester 11, N. Y.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Gibson, William D. Co., The, Div. Associated Spring Corp., 1805 Clybourn Ave., Chicago 14, Ill.
Homestead Valve Mfg. Co., P.O. Box 22, Coraopolis, Pa.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Logan Platers, Inc., 555 Main St., N. Tonawanda, N. Y.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
Mount Clemens Metal Products Co., P.O. Box 205 Mount Clemens, Mich.
Paul & Beekman, Inc., 1801 Courtland St., Philadelphia 40, Pa.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Republic Steel Corp., Niles Steel Products Div., Niles, O.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Stanley Works, The, New Britain & Bridgeport, Conn.
Toledo Stamping & Mfg. Co., 90 Fearing Blvd., Toledo 7, O.
Transue & Williams Steel Forging Corp., Alliance, O.
Universal Gear Works Inc., 1301 E. McNichols Rd., Detroit 3, Mich.
Veeder-Root, Inc., Hartford 2, Conn.
Whitehead Stamping Co., 1667 W. Lafayette Blvd., Detroit 16, Mich.
Worcester Pressed Steel Co., 501 Barber Ave., Worcester 6, Mass.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

STAMPS (Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

STAPLES (Wire)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Keystone Steel & Wire Co., Peoria 7, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STARTERS (Electrc Motor)

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 East 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

STEEL (Alloy)

Alan Wood Steel Co., Conshohocken, Pa.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Anchor Drawn Steel Co., Latrobe, Pa.
Avondale Marine Ways, Inc., Westwego, La.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Barium Steel & Forge, Inc., Canton 1, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Copperweld Steel Co., Warren, O.
Disston, Henry, & Sons Inc., 126 Tacony, Philadelphia 35, Pa.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N. Y.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Harrisburg Steel Corp., Harrisburg, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Alloy Steel Div., Massillon, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sharon Steel Corp., Sharon, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Stanley Works, The, New Britain & Bridgeport, Conn.
Superior Steel Corp., Carnegie, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Washburn Wire Co., Phillipsdale, R. I.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Alloy—Abrasve, Corrosion & Heat Resistant)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
American Rolling Mill Co., The, Rustless Iron & Steel Div., 3400 E. Chase St., Baltimore, 13, Md.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Barium Steel & Forge, Inc., Canton 1, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N.Y.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Michiana Products Corp., Michigan City, Ind.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Republic Steel Corp., Alloy Steel Div., Massillon, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Ryerson, Jos. T., & Son, Inc., 16th Rockwell Sts., Chicago 80, Ill.
Sharon Steel Corp., Sharon, Pa.
Stanley Works, The, New Britain & Bridgeport, Conn.
Superior Steel Corp., Carnegie, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.

STEEL (Alloy—Cold Finished)

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Athenia Steel Co., Clifton, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Columbia Steel and Shafting Co., Pittsburgh 30, Pa.

STEEL (Alloy-Cold Finished) (Cont'd.)

Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N.Y.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St. Indianapolis 7, Ind.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Alloy Steel Div., Massillon, O.
Ryerson, Jos. T. & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sharon Steel Corp., Sharon, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P.O. Box 1256, Pittsburgh 30, Pa.

STEEL (Clad—Corrosion Resisting) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
*Copperweld Steel Co., Warren, O.
Follansbee Steel Corp., Pittsburgh 30, Pa.
*Granite City Steel Co., Granite City, Ill.
*Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Superior Steel Corp., Carnegie, Pa.

STEEL (Cold Finished)

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N.Y.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Luria Bros. & Co., Inc., Lincoln-Liberty Bldg., Philadelphia 7, Pa
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Union Drawn Steel Div., Massillon, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sharon Steel Corp., Sharon, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.
Ward's Edgar T., Sons Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P.O. Box 1256, Pittsburgh 30, Pa.

STEEL (Die)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Anchor Drawn Steel Co., Latrobe, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Darwin & Milner, Inc., 1260 W. 4th St., Cleveland 13, O.
Disston, Henry, & Sons Inc., 126 Tacony, Philadelphia 35, Pa.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Jessop Steel Co., 534 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.

STEEL (High Speed or Carbon Tool)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Anchor Drawn Steel Co., Latrobe, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Darwin & Milner, Inc., 1260 W. 4th St., Clair 13, O.
Disston, Henry & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Holliday, W. J., & Co., Hammond, Ind.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa
Latrobe Electric Steel Co., Latrobe, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge 39, Mass.

STEEL (High Tensile, Low Alloy)

Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
Follansbee Steel Corp., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Holliday, W. J. & Co., Hammond, Ind.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sharon Steel Corp., Sharon, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Nitrided)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Bethlehem Steel Co., Bethlehem, Pa.
Republic Steel Corp., Alloy Steel Div., Massillon, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

STEEL (Screw Stock)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Holliday, W. J., & Co., Hammond, Ind.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Republic Steel Corp., Union Drawn Steel Div., Massillon, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Ward's, Edgar T., Sons Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Specialties)

Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

STEEL (Spring)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Athenia Steel Co., Clifton, N. J.
Barnes, Wallace, Co., Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Alloy Steel Div., Massillon, O.
Roebling's John A., Sons Co., Trenton 2, N. J.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.
Thomas Steel Co., The, Warren, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Weirton Steel Co., Weirton, W. Va.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Stainless)—See listings marked "*" under individual product headings.

STEEL (Strip)

Republic Steel Corp., Republic Bldg., Cleveland 1, O.

STEEL (Strip—Brass, Bronze, Copper and Nickel Coated)

American Nickeloid Co., 1310 Second St., Peru, Ill.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Stanley Works, The, New Britain & Bridgeport, Conn.
Thomas Steel Co., The, Warren, O.

STEEL (Strip—Hot or Cold Rolled) (*Also Stainless)

Alan Wood Steel Co., Conshohocken, Pa.
*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
*American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
American Tube & Stamping Plant, (Stanley Wks.) Bridgeport 7, Conn.
Athenia Steel Co., Clifton, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
*Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
Columbia Steel Co., San Francisco 6, Calif.
Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia 25, Pa.
Follansbee Steel Corp., Pittsburgh 30, Pa.
*Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
*Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
McLouth Steel Corp., 300 S. Livernois Ave., Detroit, Mich.
*Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Sharon Steel Corp., Sharon, Pa.
*Stanley Works, The, New Britain & Bridgeport, Conn.
*Superior Steel Corp., Carnegie, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Thomas Steel Co., The, Warren, O.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
*Washington Steel Corp., 9 E. Beau St., Washington, Pa.

Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Worcester Pressed Steel Co., 501 Barber Ave., Worcester 6, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Strip—Lacquer Coated)

American Nickeloid Co., 1310 Second St., Peru, Ill.
Thomas Steel Co., The, Warren, O.

STEEL (Strip—Solder Coated)

Thomas Steel Co., The, Warren, O.

STEEL (Strip—Tin Coated)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Sharon Steel Corp., Sharon, Pa.
Thomas Steel Co., The, Warren, O.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.

STEEL (Strip—Zinc Coated)

American Nickeloid Co., 1310 Second St., Peru, Ill.
American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Sharon Steel Corp., Sharon, Pa.
Thomas Steel Co., The, Warren, O.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Weirton Steel Co., Weirton, W. Va.

STEEL (Structural) (*Also Stainless)

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Bedford Foundry & Mach. Co., Bedford, Ind.
Belmont Iron Works, 22nd St. and Washington Ave., Philadelphia 46, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Clinton Bridge Works, 101 S. Second St., Clinton, Iowa.
*Columbia Steel Co., San Francisco 6, Calif.
*Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia 25, Pa.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Gage Structural Steel Co., 3123-41 S. Hayne Ave., Chicago 8, Ill.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Inland Steel Co., 28 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Bartlett-Hayward Div., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Midland Structural Steel Co., 1300-20 S. 54th Ave., Cicero 50, Ill.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
*Sharon Steel Corp., Sharon, Pa.
Standard Steel Fabricating Co., Inc., 1640 W. Hanford St., Seattle 6, Wash.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Tool)

Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.

STEEL BUILDINGS—See BRIDGES, BUILDINGS, ETC.

STEEL DOORS & SHUTTERS—See DOORS AND SHUTTERS

STEEL FABRICATORS—See BRIDGES, BUILDING, ETC.

STEEL PLATE CONSTRUCTION

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Koppers Co., Baltimore 3, Md.
Belmont Iron Works, 22nd St. and Washington Ave., Philadelphia 46, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Clinton Bridge Works, 101 S. Second St., Clinton, Iowa.
Federal Shipbuilding & Dry Dock Co., Kearney, N. J.
Gage Structural Steel Co., 3123-41 S. Hayne Ave., Chicago 8, Ill.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Midland Structural Steel Co., 1300-20 S. 54th Ave., Cicero 50, Ill.
Pollock, William B., Co., The, 101 Andrews Ave., Youngstown 1, O.
Standard Steel Fabricating Co., Inc., 1640 W. Hanford St., Seattle 6, Wash.

STELLITE

Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.

STENCILS (Spray and Sand Blast)

Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

STEPS (Safety)

Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.

STITCHING MACHINES (Metal)

Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.

STOKERS

Westinghouse Electric Corp., Steam Div., Lester, Pa.

STONES (Honing, Polishing, Sharpening)

Bay State Abrasive Products Co., Union St., Westboro, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Norton Company, Worcester 6, Mass.

STOOLS (Steel)

Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

STOPPERS (Cinder Notch)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E., Co., Inc., Sharpsburg P. O., Pittsburgh 15, Pa.

STORAGE BATTERIES—See BATTERIES (Storage)

STRAIGHTENING MACHINES—See BENDING & STRAIGHTENING MACHINES

STRAPPING (Box)

Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.
Gerrard, A. J., & Co., 221 N. LaSalle St., Chicago 1, Ill.
Gerrard Steel Strapping Co., 2915 W.47th St., Chicago 32, Ill.

STRAPPING (Steel, Copper Clad, Fibre & Steel)

Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.
Gerrard, A. J., & Co., 221 N. LaSalle St., Chicago 1, Ill.
Gerrard Steel Strapping Co., 2915 W. 47th St., Chicago 32, Ill.

STRAPPING TOOLS

Gerrard, A J., & Co., 221 N. LaSalle St., Chicago 1, Ill.

STUDS (Iron & Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Central Screw Co., Chicago 9, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Republic Steel Corp., Bolt and Nut Div., 1970 Carter Rd., Cleveland 13, O.

SWAGING MACHINES

Etna Machine Co., The, 3400 Maplewood Ave., Toledo 10, O.
Ferracute Machine Co., Bridgeton, N. J.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Torrington Co., The, Torrington, Conn.

SWITCHES (Electric)

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Trumbull Electric Mfg. Co., The, Plainville, Conn.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

TACHOMETERS

Bristol Co., The, Waterbury 91, Conn.
Ideal Industries, Inc., Sycamore, Ill.
Stewart-Warner Corp. Instrument Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Veeder-Root, Inc., Hartford 2, Conn.
Westinghouse Electric Corp., Orange Ave., Newark 1, N. J.

TANKS (Gas Auxillary)

Webb Corp., The, Webb City, Mo.

TANKS (Pickling)

Goodrich, B. F., Co., The, Akron 18, O.
Heil Process Equipment Co., 12903 Elmwood Ave., Cleveland 11, O.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
National Lead-Co., 111 Broadway, New York 6, N. Y.
Stanwood Corp., 4825 W. Cortland St., Chicago 39, Ill.

TANKS (Plating)

Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Goodrich, B. F., Co., The, Akron 18, O.
Heil Process Equipment Co., 12903 Elmwood Ave., Cleveland 11, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

TANKS (Quenching, Automatic)

American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.

TANKS (Storage, Pressure, Riveted, Welded)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Avondale Marine Ways, Inc., Westwego, La.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mahon, R. C., Co., The 8650 Mt. Elliott Ave., Detroit 11, Mich.

TANKS (Wood or Steel, Rubber or Lead Lined)

Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Goodrich, B. F., Co., The, Akron 18, O.
Heil Process Equipment Co., 12903 Elmwood Ave., Cleveland 11, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
National Lead Co., 111 Broadway, New York 6, N. Y.

TAPES, ADHESIVE (Paper, Cloth, Fibre, Acetate, Film Backing)

Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

TAPPING MACHINES

Baker Bros., Inc., Toledo 10, O.
Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.
Cincinnati Bickford Tool Co., The, 3320 Forrer Ave., Cincinnati 9, O.
Foote-Burt Co., The, Cleveland 8, O.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Moline Tool Co., 102 20th St., Moline, Ill.
National Automatic Tool Co. Inc., S. 7th & N Sts., Richmond, Ind.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

TAPS AND DIES

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Waynesboro, Pa.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.

TERNE PLATE—See TIN OR TERNE PLATE

TESTING EQUIPMENT (Hydrostatic)

Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.

TESTING EQUIPMENT (Laboratory)

Detroit Testing Machine Co., 9390 Grinnell Ave., Detroit 13, Mich.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.

TESTING EQUIPMENT (Portable)

Dravo Corp., 300 Penn Ave., Pittsburgh 22, Pa.

TESTING MACHINERY (Materials)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Detroit Testing Machine Co., 9390 Grinnell Ave., Detroit 13, Mich.

THERMIT WELDING EQUIPMENT & MATERIALS

Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.

THERMOCOUPLES

General Electric Co., Schenectady 5, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

THERMOMETERS

Bristol Co., The, Waterbury 91, Conn.

THREAD CUTTING TOOLS

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Eastern Machine Screw Corp., Truman & Barclay Sts., New Haven 6, Conn.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Landis Machine Co., Waynesboro, Pa.

THREADING MACHINES

Eastern Machine Screw Corp., Truman & Barclay Sts., New Haven 6, Conn.
Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.
Landis Machine Co., Inc., Waynesboro, Pa.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

THREADING MILLERS

Coulter, James, Machine Co., The, 629 Railroad Ave., Bridgeport 5, Conn.

TIE PLATES

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh 30, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TIN OR TERNE PLATE

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Co., Pittsburgh 30, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TIN PLATE MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wean Engineering Co., Inc., The, Warren, O.

TITANIUM

Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

TONGS (Automatic)

Blaw-Knox Div. of Blaw Knox Co., Blawnox, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.

TONGS (Rail Handling)

Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.

TOOL BITS

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Anchor Drawn Steel Co., Latrobe, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.

TOOL BITS (High Speed)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Disston, Henry & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

TOOL DESIGNING & BUILDING

Atlas Chain & Mfg. Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Guide Co., Canfield, O.
Merz Engineering Co., Indianapolis 7, Ind.
Pioneer Engineering & Mfg. Co., 19662 John R St., Detroit 3, Mich.

TOOL HARDENING

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.

TOOL HOLDERS

Cooper-Bessemer Corp., The, Mt. Vernon, O.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

TOOLS (Carbide Tipped)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., Latrobe, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
O. K. Tool Co., Inc., The, Shelton, Conn.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

TOOLS (Hand)

McKaig-Hatch, Inc., 125 Skillen St., Buffalo 7, N. Y.
New Britain Machine Co., New Britain, Conn.

TOOLS (Non-Sparking, Safety)

Ampco Metal, Inc., Dept. S-10, Milwaukee 4, Wis.

TOOLS (Pneumatic)

Cleco Div. of the Reed Roller Bit Co., P. O. Box 2119, Houston 1, Tex.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Davey Compressor Co., Kent, O.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Keller Tool Co., Grand Haven, Mich.

TOOLS (Precision, Metal Cutting, etc.)

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Buhr Machine Tool Co., 830 Greene St., Ann Arbor, Mich.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., Latrobe, Pa.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Micromatic Hone Corp., 1800 Schoolcraft Ave., Detroit 4, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.
O. K. Tool Co., Inc., The, Shelton, Conn.
Potter & Johnston Machine Co., 1027 Newport Ave., Pawtucket, R. I.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

TORCHES & BURNERS (Acetylene, Blow, Oxy-Acetylene)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.
Weldit Inc., 992 Oakman Blvd., Detroit 6, Mich.

TORCHES & BURNERS (Air—Gas)

American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.

TOWBOATS

Avondale Marine Ways, Inc., Westwego, La.
Ingalls Iron Works Co., The, Birmingham 2, Ala.

TOWERS (Transmission)

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.

TRACK ACCESSORIES

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh 30, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

TRACK BOLTS—See BOLTS (Track)

TRAILERS

Ohio Galvanizing & Mfg. Co., Penn St., Niles, O.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

TRAMRAILS

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

TRANSFORMERS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Westinghouse Electric Corp., Sharon, Pa.

TRANSFORMERS (Resistance Welding)

General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Progressive Welder Co., 3050 E. Outer Dr., Detroit 12, Mich.
Taylor-Winfield Corp., Warren, O.

TRANSMISSIONS (Automotive)

Clark Equipment Co., Buchanan, Mich.
Cleveland Worm & Gear Co., The, 3270 E. 80th St., Cleveland 4, O.
Eberhardt-Denver Co., 1419 W. Colfax Ave., Denver 4, Colo.
James, D. O., Gear Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.

TRANSMISSIONS (Hydraulic)

Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.

TRANSMISSIONS—VARIABLE SPEED

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Lovejoy Flexible Coupling Co., 5071 W. Lake St., Chicago 44, Ill.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

TREADS (Safety)

Alan Wood Steel Co., Conshohocken, Pa.
Blaw-Knox Div. of Blaw Knox Co., Blawnox, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Norton Company, Worcester 6, Mass.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tri-Lok Co., 5515 Butler St., Pittsburgh 1, Pa.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

TROLLEYS

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Ford Chain Block Div., American Chain & Cable Co., Inc., 2nd & Diamond Sts., Philadelphia 22, Pa.
Northern Engineering Works, 2615 Atwater Ave., Detroit 7, Mich.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

TRUCK CRANES

Dempster Brothers, Inc., Knoxville 17, Tenn.
Michigan Power Shovel Co., Benton Harbor, Mich.
Northwest Engineering Co., 135 S. LaSalle St., Chicago 4, Ill.

Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Thew Shovel Co., The, Lorain, O.

TRUCKS (Barrel)

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.

TRUCKS (Boom)

Dempster Brothers, Inc., Knoxville 17, Tenn.

TRUCKS (Dump-Industrial)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Automatic Transportation Co., 77 W. 87th St., Dept. T-7, Chicago 20, Ill.
Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.
Dempster Brothers, Inc., Knoxville 17, Tenn.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland 14, O.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.

TRUCKS (Hand)

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

TRUCKS (Hydraulic Lift)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Automatic Transportation Co., 77 W. 87th St., Dept. T-7, Chicago 20, Ill.
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Clark Tructractor Div. Clark Equipment Co., Battle Creek, Mich.
Dempster Brothers, Inc., Knoxville 17, Tenn.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland 14, O.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.
Truck-Man, Inc., 1410 W. Ganson St., Jackson, Mich.

TRUCKS (Industrial)

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
Automatic Transportation Co., 77 W. 87th St., Dept. T-7, Chicago 20, Ill.
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Clark Tructractor Div. Clark Equipment Co., Battle Creek, Mich.
Dempster Brothers, Inc. Knoxville 17, Tenn.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland 14, O.
Ohio Galvanizing & Mfg. Co., Penn St., Niles, O.
Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.
Truck-Man, Inc., 1410 W. Ganson St., Jackson, Mich.

TRUCKS (Lift)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Automatic Transportation Co., 77 W. 87th St., Dept. T-7, Chicago 20, Ill.
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland 14, O.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.
Truck-Man, Inc., 1410 W. Ganson St., Jackson, Mich.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

TRUCKS AND TRACTORS (Electric Industrial)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Automatic Transportation Co., 77 W. 87th St., Dept. T-7, Chicago 20, Ill.
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland 14, O.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

TRUCKS AND TRACTORS (Gasoline or Diesel—Industrial)

Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland 14, O.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.
Truck-Man, Inc., 1410 W. Ganson St., Jackson, Mich.

TUBE FITTINGS

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

TUBE MILL EQUIPMENT

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
American Electric Fusion Corp., 2610 W. Diversey Parkway, Chicago 47, Ill.
Bigwood, Joshua, & Son Ltd., Wolverhampton, England.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

TUBE WELDING MACHINES

American Electric Fusion Corp., 2610 W. Diversey Parkway, Chicago 47, Ill.
Bigwood, Joshua, & Son Ltd., Worverhampton, England.
Etna Machine Co., 3400 Maplewood Ave., Toledo 10, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

TUBES (Alloy Steel) (*Also Stainless)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
*Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
International Rolling Mill Products Co., Nikoh Tube Co., Div., 5033 S. Kedzie Ave., Chicago 32, Ill.
*National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Steel & Tubes Div., 226 E. 131st St., Cleveland 8, O.
Tubular Service Corp., 32 Broadway, New York 4, N.Y.

TUBES (Beryllium Copper)

Tube Reducing Corp., Wallington, N. J.

TUBES (Bimetal)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Tube Reducing Corp., Wallington, N. J.

TUBES (Boiler)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Steel & Tubes Div., 226 E. 131st St., Cleveland 8, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Standard Tube Co., The, 24400 Plymouth Rd., Detroit, Mich.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.

TUBES (Brass, Bronze, Copper, Nickel, Nickel Silver)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Penn Brass & Copper Co., Erie, Pa.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N.Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

TUBES (Combustion)

Carborundum Co., The, Niagara Falls, N. Y.
McDanel Refractory Porcelain Co., Beaver Falls, Pa.
Norton Co., Worcester 6, Mass.

TUBES (High Carbon)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
Standard Tube Co., The, 24400 Plymouth Rd., Detroit, Mich.
Summerill Tubing Co., Div., Columbia Steel & Shafting Co., Pittsburgh 30, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tube Reducing Corp., Wallington, N. J.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.

TUBES (Seamless Steel)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N.Y.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Summerill Tubing Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tube Reducing Corp., Wallington, N. J.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
Ward's, Edgar T., Sons Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TUBING (Alloy Steel) (*Also Stainless)

*Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
*Columbia Steel Co., Fan Francisco 6, Calif.
*Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N.Y.
*Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
*Hoyland Steel Co., Inc., 405 Lexington Ave., New York 17, N. Y.
International Rolling Mill Products Co., Nikoh Tube Co., Div., 5033 S. Kedzie Ave., Chicago 32, Ill.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
*National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Steel & Tubes Div., 226 E. 131st St., Cleveland 8, O.
*Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
*Summerill Tubing Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tube Reducing Corp., Wallington, N. J.
*Tubular Service Corp., 32 Broadway, New York 4, N. Y.
*United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.

TUBING (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

TUBING (Brass, Silicon-Bronze, Copper or Monel)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Bundy Tubing Co., 8109 E. Jefferson Ave., Detroit 14, Mich.
Calumet & Hecla Consolidated Copper Co., Wolverine Tube Div., 1439 Central Ave., Detroit 9, Mich.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Revere Copper & Brass Inc., 230 Park Ave., New York 17, N.Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.

TUBING (Condenser)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Steel & Tubes Div., 226 E. 131st St., Cleveland 8, O.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.

TUBING (Flexible Metal)

American Brass Co., The, Waterbury 88, Conn.
Chicago Metal Hose Corp., 1315 S. Third St., Maywood, Ill.
Penflex Sales Co., Div. of Pennsylvania Flexible Metallic Tubing Co., 7250 Powers Lane, Philadelphia 42, Pa.
Titeflex Inc., 1060 Broad St., Newark 5, N. J.

TUBING (Mechanical)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N.Y.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Steel & Tubes Div., 226 E. 131st St., Cleveland 8, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

TUBING (Mechanical) (Cont'd.)

Summerill Tubing Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tube Reducing Corp., Wallington, N. J.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
Ward's, Edgar T., Sons Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.

TUBING (Rubber)

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.
Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1280 Sixth Ave., New York 20, N. Y.

TUBING (Seamless)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Summerill Tubing Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Tube Reducing Corp., Wallington, N. J.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
Ward's, Edgar T., Sons Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.

TUBING (Seamless, Aluminum)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third Louisville 1, Ky.

TUBING (Square, Rectangular and Shapes) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
*Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
International Rolling Mill Products Co., Nikoh Tube Co., Div., 5033 S. Kedzie Ave., Chicago 32, Ill.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
*National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Standard Tube Co., The, 24400 Plymouth Rd., Detroit, Mich.
*Summerill Tubing Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.

TUBING (Tool Steel)

Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.

TUBING (Welded)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
International Rolling Mill Products Co., Nikoh Tube Co., Div., 5033 S. Kedzie Ave., Chicago 32, Ill.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
United Tube Co. of Ohio, 2134 W. 53rd St., Cleveland 2, O.
Ward's Edgar T., Sons Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.

TUBING (Welded Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
*American Welding & Mfg. Co., The, Warren, O.
*Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bundy Tubing Co., 8109 E. Jefferson Ave., Detroit 14, Mich.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N.Y.
*Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
International Rolling Mill Products Co., Nikoh Tube Co., Div., 5033 S. Kedzie Ave., Chicago 32, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
Republic Steel Corp., Steel & Tubes Div., 226 E. 131st St., Cleveland 8, O.
Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Standard Tube Co., The, 24400 Plymouth Rd., Detroit, Mich.
Tubular Service Corp., 32 Broadway, New York 4, N.Y.
Ward's, Edgar T., Sons Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TUBULAR PRODUCTS

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bundy Tubing Co., 8109 E. Jefferson Ave., Detroit 14, Mich.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
International Rolling Mill Products Co., Nikoh Tube Co., Div., 5033 S. Kedzie Ave., Chicago 32, Ill.
Logan Platers, Inc., 555 Main St., N. Tonawanda, N. Y.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Steel & Tubes Div., 226 E. 131st St., Cleveland 8, O.
Standard Tube Co., The, 24400 Plymouth Rd., Detroit, Mich.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
Summerill Tubing Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Ward's, Edgar T., Sons Co., Div. Columbia Steel and Shafting Co., Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TUMBLING BARRELS—SEE BARRELS (Tumbling)

TUNGSTEN CARBIDE

Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

TUNGSTEN CARBIDE (Tool and Dies)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., Latrobe, Pa.

TUNGSTEN METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

TURBINES (Steam)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
DeLaval Steam Turbine Co., Trenton 2, N. J.
General Electric Co., Schenectady 5, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

TURBO BLOWERS—See BLOWERS TURNTABLES

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.

TURRET LATHES—See LATHES (Turret)

TURRET LATHE CUTTERS (Carbide Tipped)

Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Kennametal, Inc., Latrobe, Pa.

TWIST DRILLS

Clark Equipment Co., Buchanan, Mich.
Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Greenfield Tap & Die Corp., Greenfield, Mass.

TYPE (Steel)

Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

VACUUM CLEANERS

Ideal Industries, Inc. Sycamore, Ill.
Van Dorn Electric Tool Co., The, 720 Joppa Rd., Towson 4, Md.

VACUUM TUBES (Industrial Power)

General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.

VALVE CONTROLS

Bristol Co., The, Waterbury 91, Conn.
Philadelphia Gear Works Inc., Erie Ave., & G St., Philadelphia 34, Pa.
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

VALVE CONTROLS (Motor-Operated Units)

Bristol Co., The, Waterbury 91, Conn.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

VALVES (Air Blast)

Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

VALVES (Blast Furnace)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brosius, Edgar E., Co., Inc., Sharpsburg P.O., Pittsburgh 15, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.

VALVES (Blow-off)

Homestead Valve Mfg. Co., P.O. Box 22, Coraopolis, Pa.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.

VALVES (Check)

Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.

VALVES (Chemical)

Goodrich, B. F., Co., The, Akron 18, O.

Valves (Compressed Gas Cylinder)

Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Scott Aviation Corp., Lancaster, N. Y.

VALVES (Control—Air or Hydraulic)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P.O., Philadelphia 42, Pa.
Bristol Co., The, Waterbury 91, Conn.
Cleco Div. of the Reed Roller Bit Co., P.O. Box 2119, Houston 1, Tex.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Corp., Chicago 24, Ill.
Homestead Valve Mfg. Co., P.O. Box 22, Coraopolis, Pa.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

VALVES (Electrically Operated)

Bristol Co., The, Waterbury 91, Conn.
Cutler-Hammer, Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.

VALVES (Foot)

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.

VALVES (Gas and Air Reversing)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

VALVES (Gate)

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Reading-Pratt & Cady Div., of American Chain & Cable Co., Inc., Reading, Pa.
Wood, R. D., Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

VALVES (Globe)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.

VALVES (Goggle)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Seaver, Jay J., Engineers, 100 W. LaSalle St., Chicago 2, Ill.

VALVES (Hydraulic)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Homestead Valve Mfg. Co., P.O. Box 22, Coraopolis, Pa.
Hydraulic Press Mfg. Co., The, 1044 Marion Rd., Mt. Gilead, O.
Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.
Wood, R. D., Co., Public Ledger Bldg., Independence Sq., Philadelphia 5, Pa.

VALVES (Needle)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall, P.O., Philadelphia 42, Pa.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.

VALVES (Plug)

Homestead Valve Mfg. Co., P.O. Box 22, Coraopolis, Pa.

VALVES (Steam, Water)

Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.

VANADIUM

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

VENTILATING EQUIPMENT

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Burt Mfg. Company, The, 400 S. High St., Akron 11, O.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.

VENTILATORS (Roof)

Burt Mfg. Company, The, 400 High St., Akron 11, O.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.

VIADUCTS (Steel)—See BRIDGES, ETC.

VIBRATION DAMPENERS

Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

VIBRATION ELIMINATORS, PIPING

Power Piping Div., Blaw-Knox Co., Beaver & Western Aves., Pittsburgh 2, Pa.

VISES (Pneumatic)

Hannifin Corp., Chicago 24, Ill.

WALKWAYS—See FLOORING—(Steel)

WASHERS (Finishing, Countersunk Cup)

Continental Screw Co., New Bedford, Mass.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WASHERS (Iron and Steel)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Budd Co., The, 25th St. & Hunting Park Ave., Philadelphia 32, Pa.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.
Whitehead Stamping Co., 1667 W. Lafayette Blvd., Detroit 16, Mich.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WASHERS (Lead)

Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
National Lead Co., 111 Broadway, New York 6, N. Y.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WASHERS (Lock)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WASHERS (Nonferrous and Stainless)

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
Shenango-Penn Mold Co., 470 W. Third St., Dover, O.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
U. S. Automatic Corp., Amherst, O.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WASHERS (Spring)

Barnes, Wallace, Co., Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Gibson, William D. Co., The, Div. Associated Spring Corp., 1805 Clybourn Ave., Chicago 14, Ill.
Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WATER COOLERS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass.

WATER FILTRATION & SOFTENING EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Carborundum Co., The, Niagara Falls, N. Y.

WELDED SHEET METAL ASSEMBLIES

Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Warren City Mfg. Co., Warren, O.

WELDED STEEL CONSTRUCTION

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.
Clinton Bridge Works, 101 S. Second St., Clinton, Iowa.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Gage Structural Steel Co., 3123-41 S. Hayne Ave., Chicago 8, Ill.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Midland Structural Steel Co., 1300-20 S. 54th Ave., Cicero 50, Ill.
Warren City Mfg. Co., Warren, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

WELDERS (Electric—Arc)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric Co., Schenectady 5, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Bros. Co., The, Box ST 18, Troy, O.
Lincoln Electric Co., The, Cleveland 1, O.
Martin Electric Co., 3040 E. Outer Dr., Detroit 12, Mich.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Penn Tool & Machine Co., Danville, Ill.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.
Wilson Welder & Metals Co., 60 E. 42nd St., New York 17, N. Y.

WELDERS (Electric Resistance)

American Electric Fusion Corp., 2610 W. Diversey Parkway, Chicago 47, Ill.
Federal Machine & Welder Co., 202 Dana St., Warren, O.
Martin Electric Co., 3040 E. Outer Dr., Detroit 12, Mich.

WELDERS (Spot)

American Electric Fusion Corp., 2610 W. Diversey Parkway, Chicago 47, Ill.
Federal Machine & Welder Co., 202 Dana St., Warren, O.
Martin Electric Co., 3040 E. Outer Dr., Detroit 12, Mich.
Progressive Welder Co., 3050 E. Outer Dr., Detroit 12, Mich.
Taylor-Winfield Corp., Warren, O.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

WELDING

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Electric Fusion Corp., 2610 W. Diversey Parkway, Chicago 47, Ill.
American Welding & Mfg. Co., The, Warren, O.
Avondale Marine Ways, Inc., Westwego, La.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Falk Corporation, The, Milwaukee 8, Wis.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Harnischefeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lincoln Electric Co., The, Cleveland 1, O.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Penn Tool & Machine Co., Danville, Ill.
Pollock, William B., Co., The, 101 Andrews Ave., Youngstown 1, O.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.
Warren City Mfg. Co., Warren, O.
Wilson Welder & Metals Co., 60 E. 42nd St., New York 17, N. Y.

WELDING (Hard Surface)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lincoln Electric Co., The, Cleveland 1, O.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.

WELDING (Resistance)

American Electric Fusion Corp., 2610 W. Diversey Parkway, Chicago 47, Ill.
American Welding & Mfg. Co., The, Warren, O.
Martin Electric Co., 3040 E. Outer Dr., Detroit 12, Mich.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Taylor-Winfield Corp., Warren, O.
Warren City Mfg. Co., Warren, O.

WELDING (Stainless)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Arcos Corp., 318 Gulf Bldg., Philadelphia 2, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Penn Tool & Machine Co., Danville, Ill.

WELDING (Thermit)

Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Electric)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Electric Fusion Corp., 2610 W. Diversey Parkway, Chicago 47, Ill.
Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.
Cutler-Hammer Inc., 1267 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Bros. Co., The, Box ST, 18, Troy, O.
Lincoln Electric Co., The, Cleveland 1, O.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Tweco Products Co., Wichita 1, Kan.
United States Graphite Co., Holland Ave., Saginaw, Mich.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.
Welding Engineering Co., 264 E. Ogden Ave., Milwaukee 2, Wis.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.
Wilson Welder & Metals Co., 60 E. 42nd St., New York 17, N. Y.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.
Weldit Inc., 992 Oakman Blvd., Detroit 6, Mich.

WELDING FIXTURES

Martin Electric Co., 3040 E. Outer Dr., Detroit 12, Mich
Penn Tool & Machine Co., Danville, Ill.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Taylor-Winfield Corp., Warren, O.

WELDING POSITIONERS

Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Lukenweld Div. of Lukens Steel Co., Coatesville, Pa.
Ransome Machinery Co., Dunellen, N. J.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.

WELDING RODS (Alloy) (*Also Stainless)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Arcos Corp., 318 Gulf Bldg., Philadelphia 2, Pa.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
*Harnischefeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
*Lincoln Electric Co., Cleveland 1, O.
*Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.

WELDING RODS (Alloy) (*Also Stainless) (Cont'd.)

*Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
*Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDING RODS (Bronze)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Brass Co., The, Waterbury 88, Conn.
Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Arcos Corp., 318 Gulf Bldg., Philadelphia 2, Pa.
Bridgeport Brass Co., Bridgeport 2, Conn.
Lincoln Electric Co., The, Cleveland 1, O.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Titan Metal Mfg. Co., Bellefonte, Pa.

WELDING RODS (Cast Iron)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lincoln Electric Co., The, Cleveland 1, O.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.

WELDING RODS (Hard Facing or Hard Surfacing)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Arcos Corp., 318 Gulf Bldg., Philadelphia 2, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Lincoln Electric Co., The, Cleveland 1, O.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Westinghouse Electric Corp., Dept 7-N, E. Pittsburgh, Pa.

WELDING RODS (Magnesium)

American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.

WELDING RODS (Tool Steel)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Bros. Co., The, Box ST 18, Troy, O.
Lincoln Electric Co., The, Cleveland 1, O.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDING RODS OR WIRE

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Brass Co., The, Waterbury 88, Conn.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.
Arcos Corp., 318 Gulf Bldg., Philadelphia 2, Pa.
Bridgeport Brass Co., Bridgeport 2, Conn.
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
General Electric Co., Schenectady 5, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Brothers Co., The, Box ST 18, Troy, O.
Keystone Steel & Wire Co., Peoria 7, Ill.
Lincoln Electric Co., The, Cleveland 1, O.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6, Ill.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Seneca Wire & Mfg. Co., The, Fostoria, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.
Wilson Welder & Metals Co., 60 E. 42nd St., New York 17, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WELL WATER SUPPLY SYSTEMS

Layne & Bowler, Inc., Memphis 8, Tenn.

WHEELS (Car, Locomotive or Truck)

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
American Rolling Mill Co., The, 1351 Curtis Street, Middletown, O.
American Welding & Mfg. Co., The, Warren, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Clark Equipment Co., Buchanan, Mich.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

WINCHES (Electric)

American Hoist & Derrick Co., St. Paul 1, Minn.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

WINCHES (Gasoline, Diesel)

Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

WIRE (Alloy Steel) (*Also Stainless)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)
American Rolling Mill Co., The, Rustless Iron & Steel Div., 3400 E. Chase St., Baltimore 13, Md.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
*Columbia Steel Co., San Francisco 6, Calif.
*Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
National-Standard Co., Niles, Mich.
*Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Alloy Steel Div., Massillon, O.
Roebling's John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., Fostoria, O.

WIRE (Aluminum)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

WIRE (Annealed, Bright, Galvanized, Tinned, Coppered)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Columbia Steel Co., San Francisco 6, Calif.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Keystone Steel & Wire Co., Peoria 7, Ill.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Wire Div., 332 S. Michigan Ave., Chicago 4, Ill.
Roebling's John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Wheeling Steel Corp., Wheeling, W. Va.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WIRE (Barb)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Republic Steel Corp., Wire Div., 332 S. Michigan Ave., Chicago 4, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.

WIRE (Bead Braid & Tapes)

National-Standard Co., Niles, Mich.

WIRE (Brass, Bronze, Phosphor Bronze, Silicon, Bronze, Copper or Nickel Silver)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Bristol Brass Corp., The, Bristol, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Riverside Metal Co., The, Riverside, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Seymour Manufacturing Co., The, 51 Franklin St., Seymour, Conn.
Titan Metal Mfg. Co., Bellefonte, Pa.

WIRE (Cold Drawn)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Keystone Steel & Wire Co., Peoria 7, Ill.
National-Standard Co., Niles, Mich.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Union Drawn Steel Div., Massillon, O.
Roebling's John A., Sons Co., Trenton 2, N. J.
Seneca Wire Mfg. Co., The, Fostoria, O.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.

WIRE (High Carbon)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel & Carbide Corp., McKeesport, Pa.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
National-Standard Co., Niles, Mich.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Wire Div., 332 S. Michigan Ave., Chicago 4, Ill.
Roebling's John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Union Wire Rope Corp., 21st St., & Manchester Ave., Kansas City 3, Mo.
Washburn Wire Co., 118th St. and Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WIRE (Magnet)

Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

WIRE (Music)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Roebling's John A., Sons Co., Trenton 2, N. J.
Washburn Wire Co., 118th St. and Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.

WIRE (Round, Flat, Square, Special Shapes)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Athenia Steel Co., Clifton, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Keystone Steel & Wire Co., Peoria 7, Ill.
National-Standard Co., Niles, Mich.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Wire Div., 332 S. Michigan Ave., Chicago 4, Ill.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Roebling's John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Washburn Wire Co., 118th St., & Harlem River, New York 35, N. Y.

Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WIRE (Spring)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Wire Div., 332 S. Michigan Ave., Chicago 4, Ill.
Roebling's John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Union Wire Rope Corp., 21st and Manchester Ave., Kansas City 3, Mo.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.
Youngstown Sheet & Tube Co., Youngstown 1, O.

WIRE (Stapling)

Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Roebling's John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave, New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.

WIRE (Welding)—See WELDING RODS OR WIRE

WIRE AND CABLE (Electric)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Roebling's John A., Sons Co., Trenton 2, N. J.
Welding Engineering Co., 264 E. Ogden Ave., Milwaukee 2, Wis.

WIRE CLOTH

Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Permanente Metals Corp., 1924 Broadway, Oakland 12, Calif.
Roebling's John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE COILING TOOLS (Cemented Carbide)

Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Kennametal, Inc., Latrobe, Pa.

WIRE FORMS, SHAPES AND SPECIALTIES

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
American Chain Div. American Chain & Cable Co., Inc., York, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace Co., Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
Gibson, William D. Co., The, Div. Associated Spring Corp., 1805 Clybourn Ave., Chicago 14, Ill.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Keystone Steel & Wire Co., Peoria 7, Ill.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE FORMING MACHINERY

Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Wean Engineering Co., Inc., The, Warren, O.

WIRE FORMS, SHAPES & SPECIALTIES

Cuyahoga Spring Co., 10254 Berea Rd., Cleveland 2, O.

WIRE MILL EQUIPMENT

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, Ohio.
Dore Mfg. Co., Inc., The, Grayling, Mich.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewis Machine Co., 3450 E. 76th St., Cleveland 4, O.
Morgan Construction Co., Worcester 5, Mass.
Shuster, F. B., Mfg. Co., Inc., The, New Haven 9, Conn.
Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.
Vaughn Machinery Co., Cuyahoga Falls, O.

WIRE NAILS—See NAILS

WIRE PRODUCTS (*Also Stainless)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Wire Div., 332 S. Michigan Ave., Chicago 4, Ill.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Tennessee Coal Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE ROPE

American Cable Div. of American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Hazard Wire Rope Div. of American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Macwhyte Co., 2912 14th Ave., Kenosha, Wis.,
Roebling's, John A., Sons Co., Trenton 2, N. J.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Union Wire Rope Corp., 21st and Manchester Ave., Kansas City 3, Mo.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE ROPE FITTINGS

American Cable Div. of American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Hazard Wire Rope Div. of American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
Leschen, A., & Sons, Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Macwhyte Co., 2912 14th Ave., Kenosha, Wis.
Roebling's, John A., Sons Co., Trenton 2, N. J.

WIRE ROPE SLINGS

American Cable Div., American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Hazard Wire Rope Div., American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Macwhyte Co., 2912 14th Ave., Kenosha, Wis.,
Roebling's, John A., Sons Co., Trenton 2, N. J.
Union Wire Rope Corp., 21st & Manchester Ave., Kansas City 3, Mo.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE STRAIGHTENING AND CUTTING MACHINERY

Dore Mfg. Co., Inc., The, Grayling, Mich.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewis Machine Co., 3450 E. 76th St., Cleveland 4, O.
Shuster, F. B., Mfg. Co., Inc., The, New Haven 9, Conn.

WORK REST BLADES (Centerless Grinder)

Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

WRENCHES (Adjustable)

Lapeer Mfg. Co., 2906 W. Grand Blvd., Detroit 2, Mich.
McKaig-Hatch, Inc., 125 Skillen St., Buffalo 7, N. Y.

WRENCHES (Drop Forged)

McKaig-Hatch, Inc., 125 Skillen St., Buffalo 7, N. Y.

X-RAY EQUIPMENT and SUPPLIES

Eastman Kodak Co., 343 State St., Rochester 4, N .Y.
Westinghouse Electric Corp., Baltimore 3, Md.

ZINC

New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.

ZINC ALLOYS

New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.

ZINC OXIDE

Anaconda Sales Company, 25 Broadway, New York 4, N. Y.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.,
St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y.

ZINC (Rolled Sheets, Strip, Coils)

New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.

ZINC SLABS

Anaconda Sales Company, 25 Broadway, New York 4, N. Y.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.
St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y.

ZIRCONIUM METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

Current Advertisers in STEEL

A

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.

Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.

Advance Foundry Co., The, 119 Seminary Ave., Dayton 3, O.

Aeroil Engineering Corp., 18511 Euclid Ave., Cleveland 12, O.

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.

Agerstrand Corp., Muskegon, Mich.

Air Reduction, 60 E. 42nd St., New York 17, N. Y.

Airtherm Manufacturing Co., 700 S. Spring Ave., St. Louis 10, Mo.

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.

Alan Wood Steel Co., Conshohocken, Pa.

Aldrich Pump Co., The, 2 Gordon St., Allentown, Pa.

Alemite Div., Stewart-Warner Corp., 1828 W. Diversey Pkwy., Chicago 14, Ill.

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. (Brackenridge, Pa.)

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

Allen Mfg. Co., The, 135 Sheldon St., Hartford 1, Conn.

Alliance Machine Co., The, Alliance, O.

Allied Oil Co., Inc., Standard Bldg., Cleveland 13, O.

Allied Products Corp., Dept. 29E, 4628 Lawton Ave., Detroit 8, Mich.

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.

Aluminum Co. of America, Chemicals Div., Oliver Bldg., Pittsburgh 22, Pa.

Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.

American Air Filter Co., Inc., 443 Central Ave., Louisville 8, Ky.

American Brass Co., The, Waterbury 88, Conn.

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.

American Broach & Machine Co., Ann Arbor, Mich.

American Chain & Cable Co., Inc., Bridgeport 2, Conn.

American Crayon Co., Sandusky, O.

American Electric Fusion Corp., 2610 W. Diversey Parkway, Chicago 47, Ill.

American Gas Association (Industrial Gas Section) 420 Lexington Ave., New York 17, N. Y.

American Gas Furnace Co., Lafayette & Spring Sts., Elizabeth, N. J.

American Hoist & Derrick Co., St. Paul 1, Minn.

American Hot Dip Galvanizers' Association, 1611 First National Bank Bldg., Pittsburgh 22, Pa.

American Institute of Bolt, Nut & Rivet Manufacturers, 1550 Hanna Bldg., Cleveland 15, O.

American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.

American Nickeloid Co., 1310 Second St., Peru, Ill.

American Optical Co., Scientific Instrument Div., Buffalo 15, N. Y.

American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.

American Pulverizer Co., 1539 Macklind Ave., St. Louis 10, Mo.

American Roller Bearing Co., 420 Melwood St., Pittsburgh 13, Pa.

American Roller Die Corp., 20500 St. Clair Ave., Cleveland 17, Ohio.

American Rolling Mill Co., The, Rustless Iron & Steel Div., 3400 E. Chase St., Baltimore 13, Md.

American Rolling Mill Co., The, 1351 Curtis St., Middletown, O.

American Screw Co., Providence 1, R. I.

American Shear Knife Co., P. O. Box 355, Homestead, Pa.

American Solder & Flux Co., 2153 E. Norris St., Philadelphia 25, Pa.

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.

American Welding & Mfg. Co., The, Warren, O.

American Wheelabrator & Equipment Corp., 509 S. Byrkit St., Mishawaka, Ind.

Ampco Metal Inc., Dept. S-10, Milwaukee 4, Wis.

Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.

Arcos Corp., 318 Gulf Bldg., Philadelphia 2, Pa.

Armour & Co., Sandpaper Div., 1355 W. 31st St., Chicago 9, Ill.

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.

Associated Spring Corp., Bristol, Conn.

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.

Atlas Chain & Mfg. Co., Castor & Kensington Aves., Philadelphia 24, Pa.

Atlas Drop Forge Co., Lansing 2, Mich.

"Automatic" Sprinkler Corp., of America, Brittain St., Youngstown 8, O.

Automatic Transportation Co., 77 W. 87th St., Dept. T-7, Chicago 20, Ill.

Avondale Marine Ways, Inc., Westwego, La.

B

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.

Baker Bros. Inc., Toledo 10, O.

Baker, J. E., Co., The, 114 N. George St., York, Pa.

Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.

Baldt Anchor, Chain & Forge Div., of The Boston Metals Co., Chester, Pa.

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P.O., Phila. 42, Pa.

Bantam Bearings Div., Torrington Co., The, South Bend 21, Ind.

Barber-Colman Co., 150 Loomis St., Rockford, Ill.

Barium Steel & Forge, Inc., Canton 1, Ohio.

Barnes Drill Co., 814 Chestnut St., Rockford, Ill.

Barnes, Wallace Co., Div. Associated Spring Corp., 97 Main St., Bristol, Conn.

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.

Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.

Bay City Forge Co., W. 19th & Cranberry Sts., Erie, Pa.

Bay State Abrasive Products Co., Union St., Westboro, Mass.

Bearings Co. of America, Lancaster, Pa.

Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.

Bedford Fdry. & Machine Co., Bedford, Ind.

Belmont Iron Works, 22nd St. & Washington Ave., Philadelphia 46, Pa.

Bethlehem Steel Co., Bethlehem, Pa.

Better Finishes & Coatings Inc., 268 Doremus Ave., Newark 5, N. J.

Beverly Shear Co., 3004 W. 111th St., Chicago 43, Ill.

Bigwood, Joshua, & Son, Ltd., Wolverhampton, England.

Binks Mfg. Co., 3124 W. Carroll Ave., Chicago 12, Ill.

Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.

Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.

Blaw-Knox Co., Blawnox, Pa.

Bliss, E. W., Co., 450 Amsterdam St., Detroit 2, Mich.

Bliss & Laughlin, Inc., Harvey, Ill.

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.

Brandt, Charles T., Inc., 1700 Ridgely St., Baltimore 30, Md.

Bridgeport Brass Co., Bridgeport 2, Conn.

Bridgewater Screw Products Co., Bridgewater, Mass.

Bristol Brass Corp., The, Bristol, Conn.

Bristol Co., The, Waterbury 91, Conn.

Brooke, E. & G., Iron Co., Birdsboro, Pa.

Brooks Oil Co., 315 E. Carson St., Pittsburgh 19, Pa.

Brosius, Edgar E., Co., Inc., Sharpsburg P.O., Pittsburgh 15, Pa.

Brown-Brockmeyer Co., The, P.O. Box 976, Dayton 1, O.

Brown & Sharpe Mfg. Co., Providence 1, R. I.

Browning Crane & Shovel Co., 16226 Waterloo Rd., Cleveland 10, Ohio.

Browning, Victor R., Co., Inc., Willoughby, O.

Brush Development Co., The, 3405 Perkins Ave., Cleveland 14, O.

Bryant Chucking Grinder Co., 257 Clinton St., Springfield, Vt.

Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago 6, Ill.

Budd Co., The, 25th St. & Hunting Park Ave., Philadelphia 32, Pa.

Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.

Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.

Bullard Co., The, Bridgeport 2, Conn.

Bundy Tubing Co., 8109 E. Jefferson Ave., Detroit 14, Mich.

Bunting Brass & Bronze Co., The, Toledo 9, O.

Burt Manufacturing Co., The, 400 S. High St., Akron 11, O.

By-Products Steel Co., Div. of Lukens Steel Co., Coatesville, Pa.

C

C-O-Two Fire Equipment Co., 10 Empire St., Newark 1, N. J.

Cadman, A. W., Mfg. Co., 28th & Smallman Sts., Pittsburgh 22, Pa.

Calumet & Hecla Consolidated Copper Co., Wolverine Tube Div., 1439 Central Ave., Detroit 9, Mich.

Canedy-Otto Mfg. Co., Chicago Heights, Ill.

Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.

Carborundum Co., The, Niagara Falls, N. Y.

Cardox Corp., Bell Bldg., Chicago 1, Ill.

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.

Carpenter Steel Co., 139 W. Bern St., Reading, Pa.

Cattie, Jos. P., & Bros., Gaul & Letterly Sts., Philadelphia 25, Pa.

Ceilcote Co., 750 Rockefeller Bldg., Cleveland 13, O.

Central Screw Co., Chicago 9, Ill.

Century Electric Co., 1806 Pine St., St. Louis 3, Mo.

Chambersburg Engineering Co., Chambersburg, Pa.

Champion Machine & Forging Co., 3695 E. 78th St., Cleveland 5, O.

Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.

Chandler Products Corp., Euclid 17, O.

Chandler Products Co., Euclid 17, O.

Chicago Metal Hose Corp., 1315 S. Third St., Maywood, Ill.

Chicago Perforating Co., 2443 W. 24th Pl., Chicago 8, Ill.

Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.

Cincool Div., Cincinnati Milling Machine Co., Cincinnati 9, O.

Cincinnati Bickford Tool Co., The, 3220 Forrer Ave., Cincinnati 9, O.

Cincinnati Milling Machine Co. and Cincinnati Grinders, Inc., Oakley Station, Cincinnati 9, O.

Cincinnati Shaper Co., The, Hopple, Garrard & Elam Sts., Cincinnati 25, O.

Cities Service Companies, 60 Wall Tower, New York 5, N.Y.

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.

Clark Equipment Co., Buchanan, Mich.

Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.

Clayton-Sherman Abrasives Co., Dept. C, 3896 Lonyo Rd., Detroit 10, Mich.

Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.

Cleco Div. of the Reed Roller Bit Co., P.O. Box 2119, Houston 1, Tex.

Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, O.

Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.

Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.

Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.

Cleveland Quarries Co., The 1740 E. 12th St., Cleveland 14, O.

Cleveland Tramrail Div., 1125 E. 283rd St., Wickliffe, O.

Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.

Cleveland Worm & Gear Co., The, 3270 E. 80th St., Cleveland 4, O.

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N.Y.

Clinton Bridge Works, 101 S. Second St., Clinton, Iowa.

Coes, Loring Co., Worcester, Mass.

Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.

Colonial Broach Co., P.O. Box #37, Harper Sta., Detroit 13, Mich.

Columbia Machinery & Engineering Corp., Hamilton, O.

Columbia Steel and Shafting Co., Pittsburgh 30, Pa.

Columbus-McKinnon Chain Corp., Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.

Cone Automatic Machine Co., Inc., Windsor, Vt.

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.

Continental Fdry. & Machine Co., Grant Bldg., Pittsburgh 19, Pa.

Continental Screw Co., New Bedford, Mass.

Cooper-Bessemer Corp., The, Mt. Vernon, O.

Copperweld Steel Co., Warren, O.

Corbin Screw Corp., New Britain, Conn.

Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.

Coulter, James, Machine Co., The, 629 Railroad Ave., Bridgeport 5, Conn.

Crocker-Wheeler Div. of Joshua Hendy Iron Works, Ampere 33, N. J.

Crucible Steel Casting Co., Lansdowne, Del. Co., Pa.

Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.

Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.

Curtis Pneumatic Machinery Div. of Curtis Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.

Cuyahoga Spring Co., 10254 Berea Rd., Cleveland 2, O.

D

Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.

Darwin & Milner, Inc., 1260 W. 4th St., Cleveland 13, O.

Davenport Besler Corp., Davenport, Iowa.

Davey Compressor Co., Kent, O.

Davis Keyseater Co., 399 Exchange St., Rochester 8, N. Y.

DeLaval Steam Turbine Co., Trenton 2, N. J.

Delco Products Div., General Motors Corp., 329 E. First St., Dayton 1, O.

Dempster Brothers, Inc., Knoxville 17, Tenn.

Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.

Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.

Detroit Broach Co., Inc., 20201 Sherwood Ave., Detroit 12, Mich.

Detroit Power Screwdriver Co., 2813 W. Fort St., Detroit 16, Mich.

Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.

Detroit Testing Machine Co., 9390 Grinnell Ave., Detroit 13, Mich.

Dewey & Almy Chemical Co., Cambridge 40, Mass.

Diamond Mfg. Co., Box 32, Wyoming, Pa.

Dietert, Harry W., Co., 9330 Roselawn Ave., Detroit 4, Mich.

Differential Steel Car Co., Findlay, O.

Dings Magnetic Separator Co., 4710 W. McGeogh Ave., Milwaukee 14, Wis.

Disston, Henry, & Sons, Inc., 126 Tacony, Philadelphia 35, Pa.

DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.

Dodge Mfg. Corp., Mishawaka, Ind.

Doehler-Jarvis Corp., 386 Fourth Ave., New York 16, N. Y.

Dore Mfg. Co., Inc., The, Grayling, Mich.

Dravo Corp., 300 Penn Ave., Pittsburgh 22, Pa.

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.

E

Eastern Machine Screw Corp., Truman & Barclay Sts., New Haven 6, Conn.

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

Eaton Manufacturing Co., Foundry Div., 9771 French Rd., Detroit 13, Mich.

Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.

Economy Co., Inc., 49 Vandervilt Ave., New York 17, N. Y.

Edison Storage Battery Div. of Edison, Thomas A., Inc., West Orange, N. J.

Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.

Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.

Electric Furnace Co., The, Salem, O.

Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, O.

Electric Storage Battery Co., The, 19th St. and Allegheny Ave., Philadelphia 32, Pa.

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.

Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland 14, O.

Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia 25, Pa.

Erdle Perforating Co., 171 York St., Rochester 11, N.Y.

Erie Foundry Co., Erie, Pa.

Etna Machine Co., The, 3400 Maplewood Ave., Toledo 10, O.

Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.

Eureka Fire Brick Works, 1110 B. F. Jones Law Bldg., Pittsburgh 19, Pa.

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.

Excelsior Leather Washer Mfg. Co., Rockford, Ill.

F

Fafnir Bearing Co., New Britain, Conn.

Fairfield Mfg. Co., 303 S. Earl Ave., LaFayette, Ind.

Falk Corporation, The, Milwaukee 8, Wis.

Farrel-Birmingham Co., Inc., Ansonia, Conn.

Farval Corp., The, 3270 E. 80th St., Cleveland 4, O.

Fate-Root-Heath Co., Plymouth, O.

Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

Federal Machine & Welder Co., 202 Dana St., Warren, O.

Federal-Mogul Corp., 11031 Shoemaker St., Detroit 13, Mich.

Ferracute Machine Co., Bridgeton, N. J.

Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.

Firth Sterling Steel & Carbide Corp., McKeesport, Pa.

Fitzsimons Co., The, Youngstown 8, O.

Follansbee Steel Corp., Pittsburgh 30, Pa.

Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.

Foote-Burt Co., The, Cleveland 8, O.

Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.

Foster, Frank B., Inc., 829 Oliver Bldg., Pittsburgh 22, Pa.

Foster, L. B., Co., Inc., P.O. Box 1647, Pittsburgh 30, Pa.

Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.

Fuller Brush Co., The, Industrial Div., 3582 Main St., Hartford 2, Conn.

Furnace Engineers, Inc., 1551 W. Liberty Ave., Pittsburgh 26, Pa.

G

Gage Structural Steel Co., 3123-41 S. Hayne Ave., Chicago 8, Ill.

Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.

Gardner-Denver Co., Williamson & Front Sts., Quincy, Ill.

Gas Machinery Co., The, 16100 Waterloo Rd., Cleveland 10, O.

Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.

Gaylord Container Corp., 111 N. Fourth St., St. Louis 2, Mo.

General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.

General American Transportation Corp., (Tank Car Div.), 135 S. LaSalle St., Chicago 90, Ill.

General Chemical Co., 40 Rector St., New York 6, N. Y.

General Electric Co., Schenectady 5, N. Y.

General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.

Gerding Bros., 5 E. Third St., Cincinnati 2, O.

Gerity-Michigan Die Casting Co., 1365 E. Beecher St., Adrian, Mich.

Gerrard, A. J., & Co., 221 N. LaSalle St., Chicago 1, Ill.

Gerrard Steel Strapping Co., 2915 W. 47th St., Chicago 32, Ill.

Gibson, William D. Co., The, Div. Associated Spring Corp., 1805 Clybourn Ave., Chicago 14, Ill.

Giddings & Lewis Machine Co., Fond Du Lac, Wis.

Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.

Gits Brothers Mfg. Co., 1836 S. Kilborun Ave., Chicago 23, Ill.

Glidden Co., The, Berea Rd. & Madison Ave., Cleveland 2, O.

Globe Brick Co., The, East Liverpool, O.

Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.

Goodrich, B. F. Co., The, Akron 18, O.

Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.

Granite City Steel Co., Granite City, Ill.

Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y.

Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.

Greenfield Tap & Die Corp., Greenfield, Mass.

Greenlee Brothers & Co., 1927 Mason Ave., Rockford, Ill.

Greenspon's, Jos., Son Pipe Corp., National Stock Yards, St. Clair County, Ill.

Guibert Steel Co., P.O. Box 1837, Pittsburgh 30, Pa.

Guide Co., Canfield, O.

Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.

H

Hagan George J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.

Hallden Machine Co., The, Thomaston, Conn.

Handy & Harman, 82 Fulton St., New York 7, N. Y.

Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh 1, Pa.

Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.

Hannifin Corp., Chicago 24, Ill.

Hansen Mfg. Co., The, 4031 W. 150th St., Cleveland 11, O.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.

Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.

Harrington & King Perforating Co., The, 5634 Filmore St., Chicago 44, Ill.

Harris Foundry & Machine Co., Cordele, Ga.

Harrisburg Steel Corp., Harrisburg, Pa.

Haskelite Mfg. Corp., Grand Rapids 2, Mich.

Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.

Haynes Stellite Co., Harrison & Lindsay Sts.,

Hazard Wire Rope Div., American Chain & Cable Co., Inc., Wilkes-Barre, Pa. Kokomo, Ind.

Heil Process Equipment Co., 12903 Elmwood Ave., Cleveland 11, O.

Hendrick Mfg Co., 37 Dundaff St., Carbondale, Pa.

Heppenstall Co., Dept. T.P., 4620 Hatfield St., Pittsburgh 1, Pa.

Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.

Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N. Y.

Hill Acme Co., 6400 Breakwater Ave., Cleveland 2, O.

Hindley Mfg. Co., Valley Falls, R. I.

Hobart Bros. Co., The, Box ST 18, Troy, O.

Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.

Holden, A. F., Co., The,
P.O. Box 1898,
New Haven 8, Conn.

Holliday, W. J., & Co.,
Hammond, Ind.

Homestead Valve Mfg. Co.,
P.O. Box 22, Coraopolis, Pa.

Hoover Ball & Bearing Co.,
Ann Arbor, Mich.

Horsburgh & Scott Co., The,
5112 Hamilton Ave.,
Cleveland 14, O.

Houghton, E. F., & Co.,
303 W. Lehigh Ave.,
Philadelphia 33, Pa.

Hoyland Steel Co., Inc.,
405 Lexington Ave.,
New York 17, N. Y.

Hubbard, M. D., Spring Co.,
425 Central Ave.,
Pontiac 12, Mich.

Hughes-Keenan Co., The,
585 Newman St., Mansfield, O.

Hyatt Bearings Div., General Motors
Corp., Harrison, N. J.

Hyde Park Fdry. & Machine Co.,
Hyde Park, Pa.

Hydraulic Press Mfg. Co., The,
1044 Marion Rd., Mt. Gilead, O.

Hydropress, Inc.,
570 Lexington Ave.,
New York 22, N. Y.

Hy-Test Div., International Shoe
Co., 1509 Washington Ave.,
St. Louis 3, Mo.

I

Ideal Industries, Inc.,
Sycamore, Ill.

Illinois Clay Products Co.,
214 Barber Bldg., Joliet, Ill.

Illinois Gear & Machine Co.,
2108 N. Natchez Ave.,
Chicago 35, Ill.

Independent Engineering Co.,
105 W. Second St., O'Fallon, Ill.

Independent Pneumatic Tool Co.,
600 W. Jackson Blvd.,
Chicago 6, Ill.

Industrial Brownhoist Corp.,
Bay City, Mich.

Ingalls Iron Works Co., The,
Birmingham 2, Ala.

Ingersoll-Rand Co.,
11 Broadway, New York 4, N. Y.

Ingersoll Steel Div., Borg-Warner
Corp., 310 S. Michigan Ave.,
Chicago 4, Ill.

Inland Steel Co.,
38 S. Dearborn St., Chicago 3, Ill.

International Business Machines
Corp., 590 Madison Ave.,
New York 22, N. Y.

International Graphite & Electrode
Corp., St. Marys, Pa.

International Nickel Co., Inc., The,
67 Wall St., New York 5, N. Y.

International Rolling Mill Products
Co., Nikoh Tube Co., Div., 5033
S. Kedzie Ave., Chicago 32, Ill.

International Screw Co.,
Detroit 4, Mich.

Iron & Steel Products, Inc.,
Hegewisch Sta., Chicago 33, Ill.

Irwin Mfg. Co., Inc.,
Garland, Pa.

J

Jack & Heintz Precision Industries,
Inc., Cleveland 1, O.

Jackson Iron & Steel Co.,
Jackson, O.

James, D. O., Gear Mfg. Co.,
1140 W. Monroe St.,
Chicago 7, Ill.

Jeffrey Mfg. Co., The,
889-99 N. Fourth St.,
Columbus 16, O.

Jessop Steel Co.,
584 Green St., Washington, Pa.

Johns-Manville Corp., 22 E. 40th St.,
New York 16, N. Y.

Johnson Bronze Co.,
550 S. Mill St., New Castle, Pa.

Johnson Gas Appliance Co.,
573 "E" Ave., N.W.,
Cedar Rapids, Iowa.

Johnson Machine & Press Corp.,
620 W. Indiana Ave.,
Elkhart, Ind.

Johnson Steel & Wire Co., Inc.,
Worcester 1, Mass.

Jones & Lamson Machine Co.,
Springfield, Vt.

Jones & Laughlin Steel Corp.,
Jones & Laughlin Bldg.,
Pittsburgh 30, Pa.

Jones, W. A., Fdry. & Mach. Co.,
4437 W. Roosevelt Rd.,
Chicago 24, Ill.

K

Kardong Brothers, Inc.,
346 Buchanan St.,
Minneapolis 13, Minn.

Kearney & Trecker Corp.,
6784 W. National Ave.,
Milwaukee 14, Wis.

Keller Tool Co.,
Grand Haven, Mich.

Kellogg Div. of The American
Brake Shoe Co., 97 Humbolt St.,
Rochester 9, N. Y.

Kennametal, Inc., Latrobe, Pa.

Keokuk Electro-Metals Co.,
Keokuk, Ia.

Kester Solder Co.,
4222 Wrightwood Ave.,
Chicago 39, Ill.

Keystone Abrasive Wheel Inc.,
Carnegie, Pa.

Keystone Steel & Wire Co.,
Peoria 7, Ill.

Kinnear Mfg. Co., The,
1780-1800 Fields Ave.,
Columbus 16, O.

Kling Bros. Engineering Works,
1328S N. Kostner Ave.,
Chicago 51, Ill.

Koppers Co.,
Koppers Bldg., Pittsburgh 19, Pa.

Kux Machine Co.,
3930 W. Harrison St.,
Chicago 24, Ill.

L

Laclede Steel Co.,
Arcade Bldg., St. Louis, Mo.

Lake City Malleable Co., The,
5026 Lakeside Ave.,
Cleveland 14, O.

Laminated Shim Co., Inc.,
87 Union St., Glenbrook, Conn.

Lamson & Sessions Co., The,
1971 W. 85th St., Cleveland 2, O.

Landis Machine Co.,
Waynesboro, Pa.

Landis Tool Co., Waynesboro, Pa.

Lapeer Mfg. Co.,
2906 W. Grand Blvd.,
Detroit 2, Mich.

Latrobe Electric Steel Co.,
Latrobe, Pa.

Layne & Bowler, Inc.,
Memphis 8, Tenn.

Lebanon Steel Foundry,
Lebanon, Pa.

LeBlond, R. K., Machine Tool Co.,
The, Cincinnati 8, O.

Lee Spring Co., Inc., 30 Main St.,
Brooklyn 1, N. Y.

Lepel High Frequency Laboratories
Inc., 39 W. 60th St.,
New York 23, N. Y.

Leschen, A., & Sons Rope Co.,
5909 Kennerly Ave.,
St. Louis 12, Mo.

Lester-Phoenix, Inc., 2629 Church
Ave., Cleveland 13, O.

Levinson Steel Sales Co., The,
33 Pride St., Pittsburgh 19, Pa.

Lewis Fdry. & Machine Div. of
Blaw-Knox Co.,
Pittsburgh 30, Pa.

Lewis Machine Co.,
3450 E. 76th St.,
Cleveland 4, O.

Lewthwaite, T. H., Machine Co.,
311 E. 47th St.,
New York 17, N. Y.

Lincoln Electric Co., The,
Cleveland 1, O.

Linde Air Products Co., The,
30 E. 42nd St.,
New York 17, N. Y.

Littell, F. J., Machine Co.,
4165 N. Ravenswood Ave.,
Chicago 13, Ill.

Lodge & Shipley Machine Tool Co.,
The, 3055 Colerain Ave.,
Cincinnati 25, O.

Loftus Engineering Corp.,
610 Smithfield St.,
Pittsburgh 22, Pa.

Logan Co., Inc., 536 Cabel St.,
Louisville 6, Ky.

Logan Platers, Inc.,
555 Main St.,
N. Tonawanda, N. Y.

Logemann Brothers Co.,
3126 Burleigh St.,
Milwaukee 10, Wis.

Lombard Corp., Empire Bldg.,
Youngstown 3, O.

Lovejoy Flexible Coupling Co.,
5071 W. Lake St.,
Chicago 44, Ill.

Lukens Steel Co. and Divisions,
Coatesville, Pa.

Luria Bros. & Co., Inc.,
Lincoln-Liberty Bldg.,
Philadelphia 7, Pa.

Mc

McDanel Refractory Porcelain Co.,
Beaver Falls, Pa.

McGill Mfg. Co., Inc.,
Valparaiso, Ind.

McKaig-Hatch, Inc., 125 Skillen St.,
Buffalo 7, N. Y.

McKay Machine Co., The,
546 W. Rayen St.,
Youngstown 2, O.

McKee, Arthur G., & Co.,
2300 Chester Ave.,
Cleveland 1, O.

McLouth Steel Corp.,
300 S. Livernois Ave.,
Detroit, Mich.

M

Mackintosh-Hemphill Co.,
9th & Bingham St.,
Pittsburgh 3, Pa.

Macwhyte Company,
2912 14th Ave., Kenosha, Wis.

Mahon, R. C., Co., The,
8650 Mt. Elliott Ave.,
Detroit 11, Mich.

Mansaver Industries Inc., 3101 East
St., New Haven 3, Conn.

Marchant, George F. Co., 1420 S.
Rockwell St., Chicago 8, Ill.

Markal Co., 631 N. Western Ave.,
Chicago 12, Ill.

Marlin-Rockwell Corp.,
402 Chandler St.,
Jamestown, N. Y.

Martin Electric Co.,
3040 E. Outer Dr.,
Detroit 12, Mich.

Master Electric Co., The,
100 Davis Ave., Dayton 1, O.

Master Products Co., The,
6400 Park Ave., Cleveland 5, O.

Mathews Conveyer Co.,
Ellwood City, Pa.

Matthews, Jas. H., & Co.,
3978 Forbes St.,
Pittsburgh 13, Pa.

Mattison Machine Works,
Rockford, Ill.

Medart Co., The,
3500 DeKalb St.,
St. Louis 18, Mo.

Meehanite Metal Corp.,
Pershing Square Bldg.,
New Rochelle, N. Y.

Merz Engineering Co.,
Indianapolis 7, Ind.

Mesta Machine Co., P.O. Box 1466,
Pittsburgh 30, Pa.

Metal & Thermit Corp., 120
Broadway, New York 5, N. Y.

Michiana Products Corp.,
Michigan City, Ind.

Michigan Power Shovel Co.,
Benton Harbor, Mich.

Michigan Steel Tube Products Co.,
9450 Buffalo St.,
Detroit 12, Mich.

Michigan Tool Co.,
7171 E. McNichols Rd.,
Detroit 12, Mich.

Micromatic Hone Corp.,
8100 Schoolcraft Ave.,
Detroit 4, Mich.

Midland Structural Steel Co.,
1300-20 S. 54th Ave.,
Cicero 50, Ill.

Midvale Co., The,
Nicetown, Philadelphia 40, Pa.

Midwest Steel Corp.,
Charleston, W. Va.

Minnesota Mining & Mfg. Co.,
900 Fauquier St.,
St. Paul 6, Minn.

Modern Engineering Co., Inc.,
3400 Pine St., St. Louis 3, Mo.

Moline Tool Co.,
102 20th St., Moline, Ill.

Moltrup Steel Products Co.,
Beaver Falls, Pa.

Molybdenum Corp. of America,
Grant Bldg., Pittsburgh 19, Pa.

Monarch Machine Tool Co., The,
Sidney, O.

Monarch Steel Co.,
545 W. McCarty St.,
Indianapolis 7, Ind.

Morgan Construction Co.,
Worcester 5, Mass.

Morgan Engineering Co., The,
Alliance, O.

Morse Chain Co., Ithaca, N. Y.

Morton Mfg. Co.,
Muskegon Heights, Mich.

Motch & Merryweather Machinery
Co., Penton Bldg.,
Cleveland 13, O.

Mount Clemens Metal Products Co.,
P.O. Box 205,
Mount Clemens, Mich.

N

National Acme Co., The,
170 E. 131st St., Cleveland 8, O.

National Automatic Tool Co. Inc.,
S. 7th & N Sts., Richmond, Ind.

National Bearing Div., American
Brake Shoes Co., 4930 Manchester
Ave., St. Louis 10, Mo.

National Carbon Co., Inc.,
30 E. 42nd St., New York 17, N.Y.

National Cylinder Gas Co., 205 W.
Wacker Dr., Chicago 6, Ill.

National Erie Corp., Erie, Pa.

National Forge & Ordnance Co.,
Irvine, Warren Co., Pa.

National Lead Co.,
111 Broadway, New York 6, N. Y.

National Machinery Co., The,
Tiffin, O.

National Motor Bearing Co., Inc.,
Box 1030, Redwood City, Calif.

National Screw & Mfg. Co., The,
2440 E. 75th St., Cleveland 4, O.

National-Standard Co., Niles, Mich.

National Steel Corp.,
Grant Bldg., Pittsburgh 19, Pa.

National Tool Co., The,
11200 Madison Ave.,
Cleveland 2, O.

National Tube Co., Frick Bldg.,
Pittsburgh 30, Pa.

New Britain Machine Co.,
New Britain, Conn.

New Departure Div., General Mo-
tors, Bristol, Conn.

New England Screw Co.,
Keene, N. H.

New Jersey Zinc Co., The,
160 Front St., New York 7, N. Y.

New York & New Jersey Lubricant
Co., 292 Madison Ave.,
New York 17, N. Y.

Newcomb-Detroit Co.,
5741 Russell St.,
Detroit 11, Mich.

Niagara Machine & Tool Works,
637-697 Northland Ave.,
Buffalo 11, N. Y.

Northern Engineering Works,
2615 Atwater Ave.,
Detroit 7, Mich.

Northwest Chemical Co.,
9310 Roselawn Ave.,
Detroit 4, Mich.

Northwest Engineering Co.,
135 S. LaSalle St.,
Chicago 4, Ill.

Northwest Steel Rolling Mills,
4315 Ninth Ave., Seattle, Wash.

Norton Co., Worcester 6, Mass.

O

Oakite Products, Inc.,
34E Thames St.,
New York 6, N. Y.

Ohio Crankshaft Co., The,
3800 Harvard Ave.,
Cleveland 1, O.

Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.

Ohio Galvanizing & Mfg. Co., Penn St., Niles, O.

Ohio Locomotive Crane Co., Bucyrus, O.

Ohio Seamless Tube Co., The, Shelby, O.

Ohio Steel Foundry Co., Lima & Springfield, O.

O. K. Tool Co., Inc., The, Shelton, Conn.

O'Neil-Irwin Mfg. Co., 304 8th Ave. S., Lake City 15, Minn.

Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.

Osgood Co., The, Marion, O.

Ottumwa Iron Works, Ottumwa, Ia.

Owen Bucket Co., 6013 Breakwater Ave., Cleveland 2, O.

Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, O.

Ozalid Products Div. General Aniline & Film Corp., Johnson City, N. Y.

P

Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.

Pangborn Corporation, Hagerstown, Md.

Parker Appliance Co., The, 17325 Euclid Ave., Cleveland 12, O.

Parker, Chas., Co., The, Meriden, Conn.

Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.

Parker Rust Proof Co., 2158 E. Milwaukee Ave., Detroit 11, Mich.

Paul & Beekman, Inc., 1801 Courtland St., Philadelphia 40, Pa.

Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.

Pawtucket Screw Co., Pawtucket, R. I.

Paxson Machine Co., Benton Rd., Salem, O.

Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.

Penflex Sales Co., Div. of Pennsylvania Flexible Metallic Tubing Co., 7250 Powers Lane, Philadelphia 42, Pa.

Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Mich.

Penn Brass & Copper Co., Erie, Pa.

Penn Tool & Machine Co., Danville, Ill.

Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

Perkins, B. F., & Son, Inc., Holyoke, Mass.

Permanente Metals Corp., 1924 Broadway, Oakland 12, Cal.

Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.

Philadelphia Gear Works Inc., Erie Ave., & G St., Philadelphia 34, Pa.

Phillips Screw Manufacturers, Providence 1, R. I.

Pickands Mather & Company, Union Commerce Bldg., Cleveland 14, O.

Pioneer Engineering & Mfg. Co., 19662 John R St., Detroit 3, Mich.

Pittsburgh Commercial Heat Treating Co., 49th St. & A. V. R. R., Pittsburgh 1, Pa.

Pittsburgh Crushed Steel Co., 4839 Harrison St., Pittsburgh 1, Pa.

Pittsburgh Gear & Machine Co., 2680-2700 Smallman St., Pittsburgh 22, Pa.

Pittsburgh Lectrodryer Corp., P. O. Box 1766, Pittsburgh, Pa.

Pittsburgh Lectromelt Furnace Corp., P. O. Box 1257, Pittsburgh 30, Pa.

Pittsburgh Plate Glass Co., Brush Div., 3221 Frederick Ave., Baltimore 29, Md.

Pittsburgh Plate Glass Co., Paint Div., 632 Duquesne Way, Pittsburgh 22, Pa.

Pittsburgh Rolls Div. of Blaw-Knox Co., Pittsburgh 1, Pa.

Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.

Plymouth Locomotive Works, Fate-Root-Heath Co., Plymouth, O.

Pollock, William B., Co., The, 101 Andrews Ave., Youngstown 1, O.

Poole Fdry. & Machine Co., Woodberry, Baltimore 11, Md.

Porter, H. K., Co., Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.

Post, Frederick, Co., The, 3650 N. Avondale Ave., Chicago 18, Ill.

Potter & Johnston Machine Co., 1027 Newport Ave., Pawtucket, R. I.

Power Plants Inc., 1755 E. 33rd St., Cleveland 14, O.

Precision Scientific Co., 3737 Cortland St., Chicago 47, Ill.

Pressed Steel Car Co., Inc., Grant Bldg., Pittsburgh 19, Pa.

Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.

R

Rail & Industrial Equipment Co., 30 Church St., New York 7, N. Y.

Ransome Machinery Co., Dunellen, N. J.

Rapids-Standard Co., Inc., The, Peoples Nat'l Bank Bldg., Grand Rapids 2, Mich.

Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.

Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.

Ready-Power Co., The, 3824 Grand River Ave., Detroit 8, Mich.

Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, O.

Reliance Steel Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.

Remington Rand Inc., Systems Div., 315 Fourth Ave., New York 10, N. Y.

Republic Steel Corp., Dept. ST, Cleveland 4, O.

Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.

Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

Riverside Metal Co., The, Riverside, N. J.

Robins Conveyors, Inc., Div. of Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.

Robinson Clay Products Co., The, 1100 Second National Bank Bldg., Akron 8, O.

Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.

Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minn.

Roebling's, John A., Sons Co., Trenton 2, N. J.

Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.

Roots-Connersville Blower Corp., Connersville, Ind.

Ross Heater & Mfg. Co. Inc., 1431 West Ave., Buffalo 13, N. Y.

Ruemelin Mfg. Co., 3882 N. Palmer St., Milwaukee 12, Wis.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

Rust-Oleum Corp., 2425 W. Oakton, Evanston, Ill.

Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 50, Ill.

S

S K F Industries, Inc., Philadelphia 32, Pa.

Salem Engineering Co., 714 S. Broadway, Salem, O.

Samuel, Frank, & Co. Inc., Harrison Bldg., Philadelphia 2, Pa.

Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.

Schmieg Industries, Inc., 298 Piquette Ave., Detroit 2, Mich.

Scott Aviation Corp., Lancaster, N. Y.

Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.

Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

Seaver, Jay J., Engineers, 100 W. LaSalle St., Chicago 2, Ill.

Selas Corp. of America, 18th & Indiana Sts., Philadelphia 32, Pa.

Seneca Wire & Mfg. Co., The, Fostoria, O.

Seymour Mfg. Co., The, 51 Franklin St., Seymour, Conn.

Shafer Bearing Corp., Chicago 7, Ill.

Shakeproof Lock Washer Co., Chicago, Ill.

Sharon Steel Corp., Sharon, Pa.

Shawinigan Products Corp., Empire State Bldg., New York 1, N. Y.

Sheffield Corp., The, 721 Springfield St., Dayton 1, O.

Shenango-Penn Mold Co., Oliver Bldg., Pittsburgh 22, Pa.

Shenango-Penn Mold Co., Bronze Dept., 470 W. Third St., Dover, O.

Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

Shreve, Walker & Associates, 1201 Michigan Bank Bldg., Detroit 26, Mich.

Shuster, F. B., Mfg. Co., Inc., The, New Haven 9, Conn.

Sibley Machine & Foundry Corp., 206 E. Tutt St., South Bend 3, Ind.

Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.

Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.

Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.

Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

Sinclair Refining Co., 630 Fifth Ave., New York 20, N. Y.

Smeeth-Harwood Co., 2401-09 W. Cermak Rd., Chicago 8, Ill.

Snyder Tool & Engineering Co., 3400 East Lafayette Ave., Detroit 7, Mich.

Snyder, W. P., & Co., Oliver Bldg., Pittsburgh 22, Pa.

South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.

Southern Ferro Alloys Div. of Tennessee Products & Chemical Corp., 2108 Chestnut St., Chattanooga 2, Tenn.

Southington Hardware Mfg. Co., Southington, Conn.

Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.

St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y.

Standard Conveyor Co., 135 Second Ave., N. St. Paul 9, Minn.

Standard Machinery Co., 1475 Elmwood Ave., Providence 7, R. I.

Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

Standard Steel Fabricating Co., Inc., 1640 W. Hanford St., Seattle, 6, Wash.

Standard Steel Works Div. of the Baldwin Locomotive Works, Paschall P. O., Philadelphia 42, Pa.

Standard Tube Co., The, 24400 Plymouth Rd., Detroit, Mich.

Stanley Works, The, New Britain & Bridgeport, Conn.

Stanwood Corp., 4825 W. Cortland St., Chicago 39, Ill.

Steel and Tubes Div. Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.

Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.

Steel Parts Mfg. Corp. Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.

Sterling Bolt Co., 217 W. Jackson Blvd., Chicago 6, Ill.

Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Parkway, Chicago 14, Ill.

Strom Steel Ball Co., 1850 S. 54th Ave., Cicero 50, Ill.

Stuart, D. A., Oil Co., Ltd., 2735½ S. Troy St., Chicago 23, Ill.

Sturgis Products Co., Sturgis, Mich.

Sun Oil Co., Dept. 1, Philadelphia 3, Pa.

Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.

Superior Steel Corp., Carnegie, Pa.

Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.

Sutton Engineering Co., Bellefonte, Pa.

Swallow Airplane Co., Inc., Wichita, Kans.

Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.

T

Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

Taylor-Wharton Iron & Steel Co., Easton, Pa.

Taylor-Winfield Corp., Warren, O.

Texas Co., The, 135 E. 42nd St., New York 17, N. Y.

Thermo Electric Mfg. Co., 480 W. Locust St., Dubuque, Ia.

Thew Shovel Co., The, Lorain, O.

Thomas Machine Mfg. Co., Etna Branch P. O. Pittsburgh 23, Pa.

Thomas Steel Co., The, Warren, O.

Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

Thompson, Henry G., & Son Co., New Haven 5, Conn.

Tide Water Associated Oil Co., 17 Battery Pl., New York 4, N. Y.

Timken Roller Bearing Co., The, Canton 6, O.

Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.

Tinnerman Products Inc., 2039 Fulton Rd., Cleveland 13, O.

Titan Metal Mfg. Co., Bellefonte, Pa.

Titeflex Inc., 1060 Broad St., Newark 5, N. J.

Toledo Stamping & Mfg. Co., 90 Fearing Blvd., Toledo 7, O.

Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.

Torrington Co., The, Torrington, Conn.

Tourek, J. J., Mfg. Co., 4701-11 West 16th St., Chicago 50, Ill.

Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.

Transue & Williams Steel Forging Corp., Alliance, O.

Tri-Boro Steel Supply Co., Inc., 620 Fifth Ave., New York 20, N. Y.

Truck-Man, Inc., 1410 W. Ganson St., Jackson, Mich.

Trumbull Electric Mfg. Co., The, Plainville, Conn.

Tube Reducing Corp., Wallington, N. J.

Tubular Service Corp., 32 Broadway, New York 4, N. Y.

Tweco Products Co., Wichita 1, Kan.

U

Udylite Corp., The,
1651 E. Grand Blvd.,
Detroit 11, Mich.

Union Chain & Mfg. Co.,
Sandusky, O.

Union Drawn Steel Div.,
Republic Steel Corp.,
Massillon, O.

Union Steel Castings Div. of Blaw-Knox Co., Pittsburgh 1, Pa.

Union Wire Rope Corp.,
21st and Manchester Ave.,
Kansas City 3, Mo.

Unit Crane & Shovel Co., 6411 W. Burnham St., Milwaukee 14, Wis.

United Chromium, Inc.,
51 E. 42nd St.,
New York 17, N. Y.

United Engineering & Foundry Co.,
1st Nat'l Bank Bldg.,
Pittsburgh 22, Pa.

U. S. Automatic Corp.,
Amherst, O.

United States Graphite Co., The,
Saginaw, Mich.

United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave.,
New York 20, N. Y.

United States Steel Corp.,
436—7th Ave., Pittsburgh 30, Pa.

United States Steel Supply,
P. O. Box M M, Chicago 90, Ill.

United Tube Co. of Ohio,
2134 W. 53rd St., Cleveland 2, O.

Universal Gear Works Inc.,
1301 E. McNichols Rd.,
Detroit 3, Mich.

Upton Electric Furnace Div.,
Commerce Pattern Fdry. & Machine Co., 7450 Melville Ave.,
Detroit 17, Mich.

Utica Radiator Corp., 2201 Dwyer Ave., Utica 2, N. Y.

V

Vacu-Blast Co., Inc., 350 Peninsular Ave., San Mateo, Cal.

Valley Mould & Iron Co.,
Hubbard, O.

Vanadium Corp. of America,
420 Lexington Ave.,
New York 17, N. Y.

Van Dorn Electric Tool Co., The,
720 Joppa Rd., Towson 4, Md.

Van Norman Co., 3640 Main St.,
Springfield, Mass.

Vaughn Machinery Co.,
Cuyahoga Falls, O.

Veeder-Root, Inc.,
Hartford 2, Conn.

Verson Allsteel Press Co.,
1355 E. 93rd St.,
Chicago 19, Ill.

Victor Equipment Co.,
844-54 Folsom St.,
San Francisco 7, Cal.

Vonnegut Moulder Corp.,
1819 Madison Ave.,
Indianapolis 2, Ind.

W

Waldron, John, Corp.,
New Brunswick, N. J.

Walker-Turner Co., Inc.,
50123 Berckman St.,
Plainfield, N. J.

Wapakoneta Machine Co., The,
Wapakoneta, O.

Warner & Swasey Co.,
5701 Carnegie Ave.,
Cleveland 3, O.

Warren City Mfg. Co.,
Warren, O.

Washburn Wire Co.,
118th St. & Harlem River,
New York 35, N. Y.

Washington Steel Corp., 9 E. Beau St., Washington, Pa.

Wassell Organization, The,
Westport, Conn.

Wean Engineering Co., Inc., The,
Warren, O.

Webb Corp., The, Webb City, Mo.

Weinman Pump & Supply Co., The,
207-209 Blvd. of the Allies,
Pittsburgh 22, Pa.

Weirton Steel Co.,
Weirton, W. Va.

Welding Engineering Co.,
264 E. Ogden Ave.,
Milwaukee 2, Wis.

Weldit Inc.,
992 Oakman Blvd.,
Detroit 6, Mich.

Wellman Engineering Co., The,
7000 Central Ave.,
Cleveland 4, O.

Wells Mfg. Corp., 1515 Filmore St.,
Three Rivers, Mich.

Wesche, B. A., Electric Co., The,
1628 Vine St., Cincinnati 10, O.

West Penn Machinery Co.,
1208 House Bldg.,
Pittsburgh 22, Pa.

Westinghouse Electric Corp.,
Dept. 7-N, E. Pittsburgh, Pa.

Wheel Trueing Tool Co.,
3200 W. Davison Ave.,
Detroit 6, Mich.

Wheelco Instruments Co.,
847 W. Harrison St.,
Chicago 7, Ill.

Wheeling Steel Corp.,
Wheeling, W. Va.

Wheelock, Lovejoy & Co., Inc.,
128 Sidney St.,
Cambridge 39, Mass.

Wheland Co., The,
Chattanooga 2, Tenn.

Whistler, S. B., & Sons, Inc.,
748-756 Military Rd.,
Buffalo 7, N. Y.

Whitcomb Locomotive Co.,
Rochelle, Ill.

Whitehead Stamping Co.,
1667 W. Lafayette Blvd.,
Detroit 16, Mich.

Whitney Screw Co.,
Waterbury, Conn.

Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co.,
500 Fifth Ave.,
New York 18, N. Y.

Williams, White & Co.,
801 Third Ave., Moline, Ill.

Willson Products, Inc.,
2nd & Washington Sts.,
Reading, Pa.

Wilson, Lee, Engineering Co., Inc.,
20005 Lake Rd., Cleveland 16, O.

Wilson Welder & Metals Co.,
60 E. 42nd St.,
New York 17, N. Y.

Wisconsin Motor Corp.,
Milwaukee 14, Wis.

Wisconsin Steel Co.,
180 N. Michigan Ave.,
Chicago 1, Ill.

Wittek Mfg. Co.,
4305 W. 24th Place,
Chicago 23, Ill.

Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

Wood, R. D., Co., Public Ledger Bldg., Independence Sq.,
Philadelphia 5, Pa.

Worcester Pressed Steel Co.,
501 Barber Ave.,
Worcester 6, Mass.

Worth Steel Co.,
Claymont, Del.

Wrigley, Wm., Jr. Co.,
410 N. Michigan Ave.,
Chicago 11, Ill.

Wrought Washer Mfg. Co.,
2103 S. Bay St., Milwaukee 7, Wis.

Wyckoff Steel Co.,
P. O. Box 1256,
Pittsburgh 30, Pa.

Y

Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

Yoder Co., The,
5500 Walworth Ave.,
Cleveland 2, O.

Young Brothers Co., 6500 Mack Ave., Detroit 7, Mich.

Youngstown Alloy Casting Corp.,
103 E. Indianola Ave.,
Youngstown 1, O.

Youngstown Sheet & Tube Co., The,
Youngstown 1, O.

Z

Zeh & Hahnemann Co.,
56 Avenue A, Newark 5, N. J.

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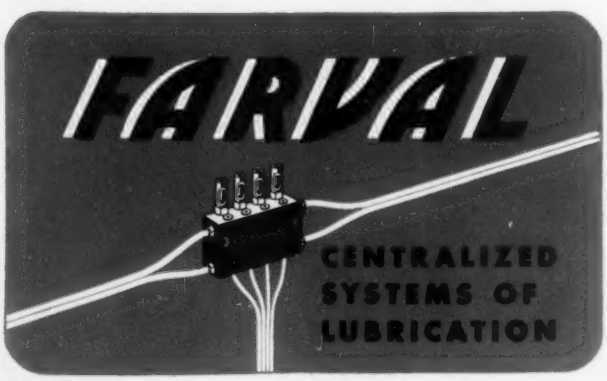
FARVAL—*Studies in Centralized Lubrication No. 100*

A LARGE steel mill in the Pittsburgh district reports that the best tonnage obtained from a composition bearing on a 40-inch blooming mill when lubricated with river water only, was approximately 379,000 tons.

By installing Farval Centralized Grease Lubrication and using good city water, the mill was able to obtain 1,372,997 tons before the bearings wore sufficiently to require replacement . . . an increase of almost one million tons. The Farval system delivered a measured quantity of grease to the bearings every 12 minutes.

The illustration at the right shows the Farval-lubricated composition bearing which was removed from the top roll neck on the pressure end of the mill after it had rolled the 1,372,997 tons.

Farval delivers oil or grease under pressure to a group of bearings from one central station, in exact quantities, while a machine is in operation. Farval is the Dualine System with the Positive Piston Displacement Valve. This valve has but two moving parts and is fully adjustable, with a Tell-tale indicator at each bearing to show the job is done. For a full description of Farval, write for Bulletin 25. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

Farval-lubricated composition bearing after it had rolled 1,372,997 tons.

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